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Bothalia

A RECORD OF

CONTRIBUTIONS

FROM THE

NATIONAL HERBARIUM

UNION OF SOUTH AFRICA

PRETORIA

EDITED BY

R. A. DYER, M.Sc., D.Sc., F.R.S. (S.Afr.),

CHIEF, DIVISION OF BOTANY AND PLANT PATHOLOGY, DEPARTMENT OF AGRICULTURE

PRETORIA; AND

DIRECTOR OF THE BOTANICAL SURVEY OF THE UNION OF SOUTH AFRICA

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THE METHOD OF PARASITISM OF SOME SOUTH AFRICAN MICROTHYRIALES.

By C. G. Hansford.

The present paper deals with five species which were considered by Doidge in her review of the South African Microthyriaceae* as showing fairly close relationship to one another, chiefly owing to the rarity of hyphopodia on the external mycelium. In view of the wide range of absorption mechanisms in the Microthyriales, it was felt advisable to investigate the present five species in detail, and the writer is indebted to Dr. Doidge for supply of material of each species for examination. Transverse sections of infected leaves

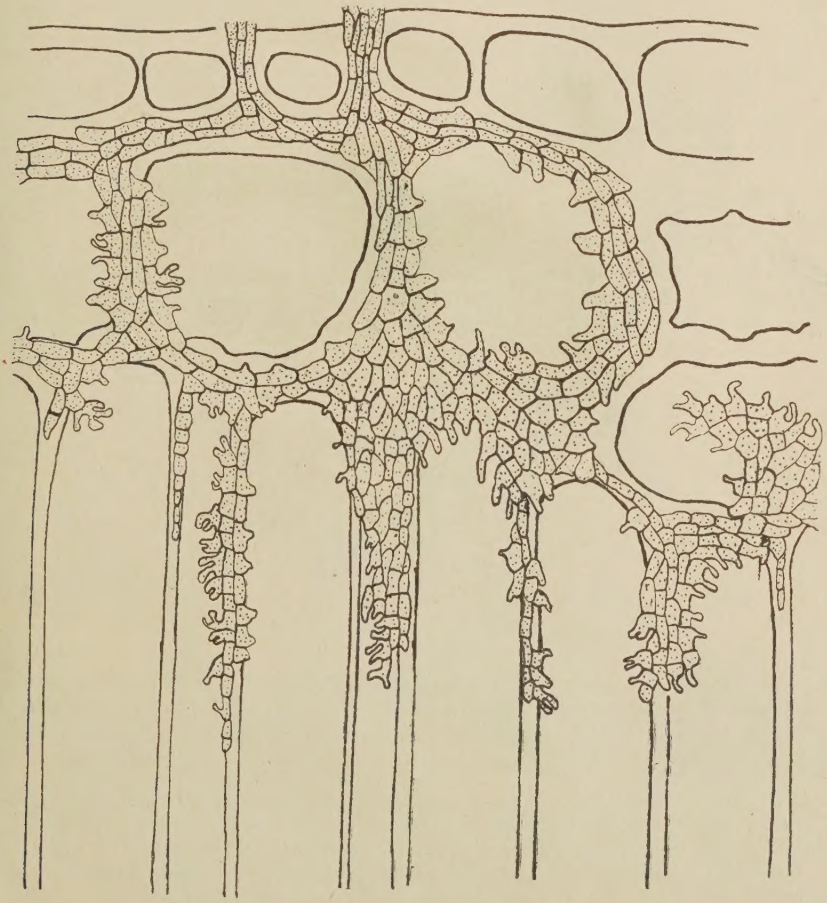


Fig. 1.

* Doidge, E. M., Revision of South African Microthyriaceae. Bothalia IV, p. 273, 1942.

were cut and stained in Gueguen's stain, to obtain details of the absorption mechanism of each fungus, and the results obtained were checked by cutting horizontal sections so as to trace the connectionof the internal mycelium or haustoria with the external mycelium and hyphopodia.

Asterina dissiliens (Syd.) Doidge.

in Bothalia IV, p. 287, 1942.

In this species the hyphopodia are few and only on the main hyphae of the mycelium. Below the centre of the colony there is an extensive internal mycelium of hyaline hyphae penetrating through the cuticle and between the cells of the epidermis to form a thin layer around the upper ends of the palisade cells. The whole of this internal mycelium is divided by cross septs into small cells, and is entirely intercellular ; it encloses the subepidermal and upper parts of the palisade cells with a thin plate of mycelium, usually one cell thick. In Fig. 1 this internal mycelium is shown in transverse section ; the digitate processes

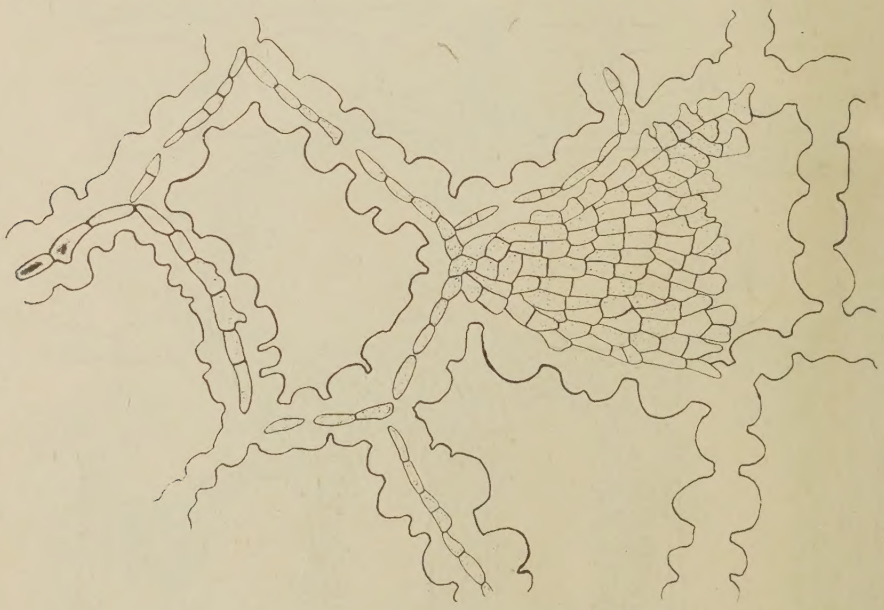


Fig. 2.

around the edge of each plate of mycelium do not penetrate the walls of the host cells, but are limited to the middle lamella and are shown in the figure in surface view. This internal mycelium is shown in Fig. 2 in horizontal section through the subepidermal layer of the host leaf.

At irregular intervals throughout the colony other smaller patches of internal mycelium are formed, usually not penetrating below the subepidermis of the host, and each connected directly through the cuticle with the external mycelium. I have been unable to detect any connection between these scattered plates of internal mycelium and the scattered hyphopodia, which appear to be functionless in this species. In Fig. 3 one of these subsidiary internal mycelia is shown in transverse section, connected directly with a cell of the external mycelium, while in Fig. 4 two plates of internal mycelium are shown originating from terminal cells of external hyphae. The last figure is of especial interest, as it shows

that the external mycelium does not penetrate through the stomatal opening to form its internal connection, but penetrates the cuticle through a groove surrounding each stoma, nto the adjacent epidermis. In other cases penetration of the cuticle bears no relation to the stomata of the host leaf.

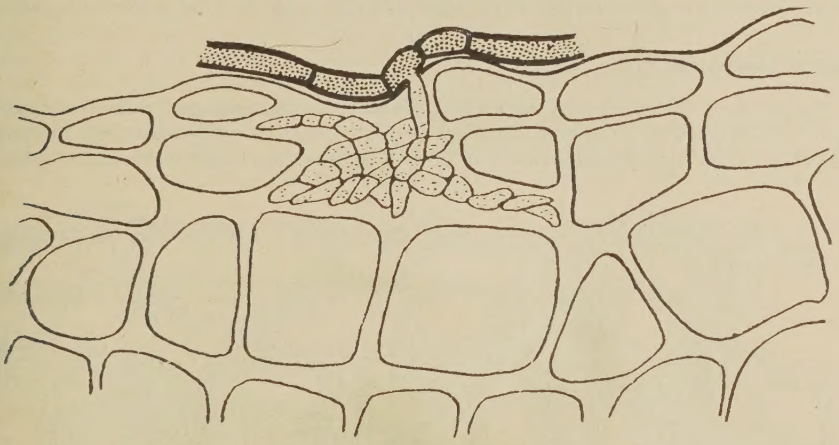


Fig. 3.

In view of the presence of an extensive internal mycelium and of the apparent absence of functional hyphopodia, it seems to the writer preferable to remove this species from the genus *Asterina*, which in our view should be limited to species of true ecto-parasitic habit,

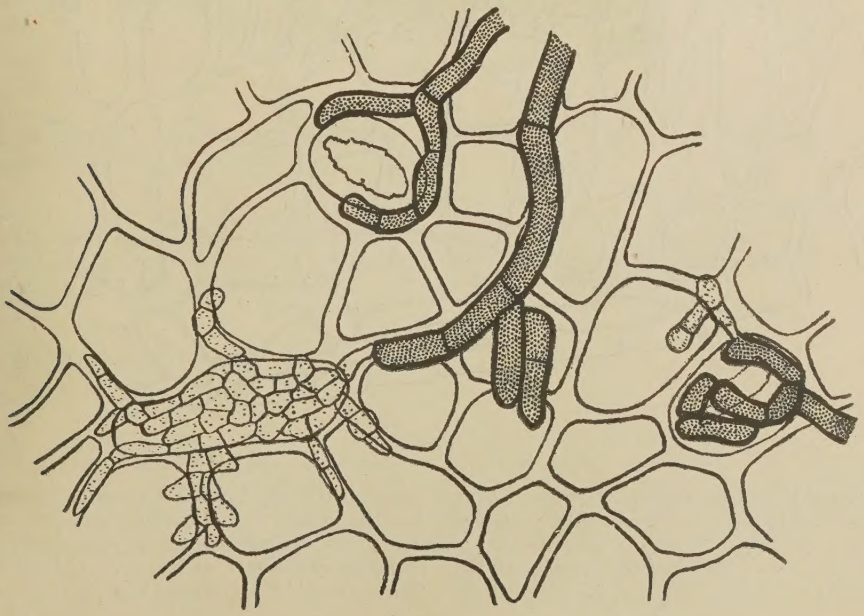


Fig. 4.

possessing hyphopodia and haustoria in epidermis and subepidermis formed singly and exclusively from the hyphopodia. For the present it appears best to return the species to the genus *Asterinella*, in which it was originally placed by Sydow.* This genus contains species with a wide range of internal absorption mechanisms, and at present it is not possible to sort these into separate genera on the basis of habit, with the information now available.

Asterina inconspicua Doidge, l.c.

Each colony of this species, on *Chilianthus arboreus*, shows a dark yellowish-brown to brown central spot in the underlying host tissues. In section this spot (Fig. 5) contains a subcuticular plate of mycelium varying from dark brown in colour in the centre to hyaline

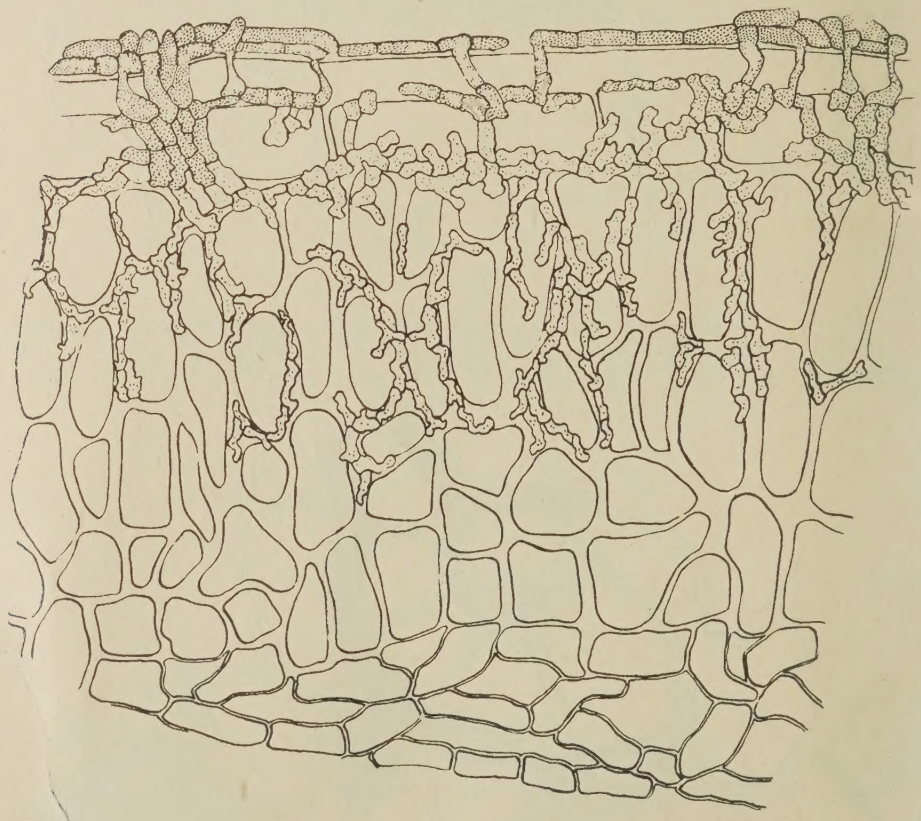


Fig. 5.

around the edges, and connected at frequent intervals directly through the cuticle with the external hyphae, which are closely aggregated in this region and often form almost a solid plate of cells. From the subcuticular layer tortuous, shortly septate hyphae penetrate between the cells of the epidermis and palisade layers of the leaf, and in some old colonies they may almost reach the lower epidermis. The cell walls of the invaded tissue are changed

* Sydow, H., in Ann. Myc. XXII. p. 425, 1924.

chemically so that they stain pink to red with Sudan III, while their contents are partly or completely disorganised and no longer contain visible chloroplasts. The whole internal mycelium is intercellular and no haustoria are produced in the host cells.

At irregularly scattered points over the colony subsidiary penetrations of the host are made, direct through the cuticle. These originate from some of the hyphopodia, which first form a delicate hypha penetrating through the cuticle and spreading over the epidermis underneath. While this is occurring, the hyphae of the external mycelium form a small irregular plate of short branches surrounding the hyphopodium, and at a later stage some of these branches penetrate the cuticle to connect with the enlarging subcuticular mycelium. Early stages in the development of these subsidiary internal connections are shown in Fig. 6, one viewed from the surface of the leaf, and the other from below the epidermis.

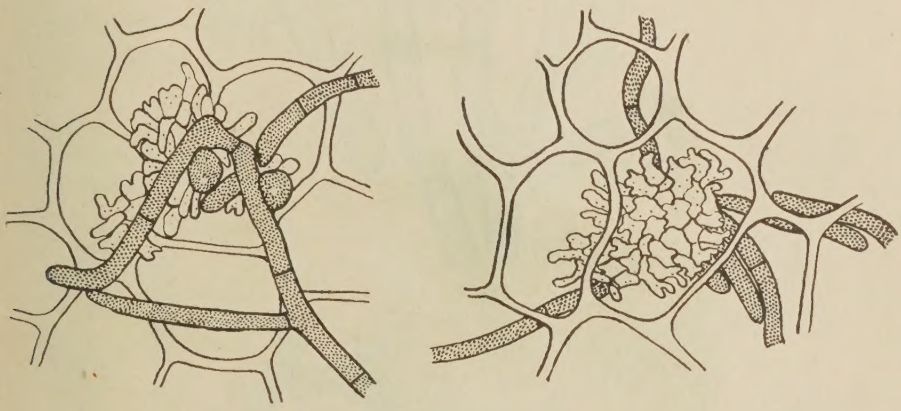


Fig. 6.

In these drawings the internal mycelium is shown lightly shaded, and at these stages is entirely subcuticular and hyaline.

In view of the extensive internal mycelium of this species the writer prefers to remove it from the genus *Asterina*, as **Asterinella inconspicua** (Doidge) comb. n., though it may be regarded as exhibiting a transition towards the true ectoparasitism of *Asterina* in that the hyphopodia become functional late in the development of the colony.

Asterina secamonicola Doidge.

in Bothalia II, p. 233, 1927.

As noted by Doidge (l.c., IV, p. 286), the hyphae of the external mycelium are much branched around the scattered hyphopodia, and in mature colonies most of the hyphopodia are surrounded by a close irregular plate of mycelium. (Fig. 7). Viewed from below the epidermis the hyphopodium is seen to have produced a coralloid hyaline haustorium filling the whole upper part of a single epidermal cell (Fig. 8). In transverse section (Fig. 9), the haustorium may either be inside the epidermal cell, more or less adnate to its upper wall, or in other cases apparently external to the epidermal cell and beneath the cuticle. I have been quite unable to detect any other internal absorption apparatus in this species, which is therefore correctly classified as an *Asterina*, and truly ecto-parasitic in habit.

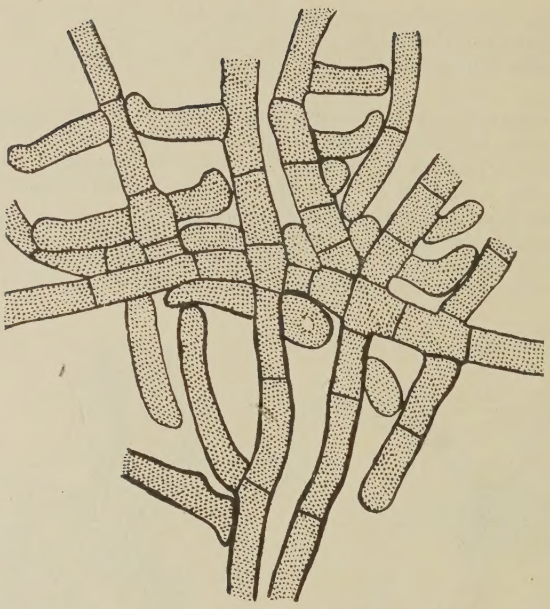


Fig. 7.

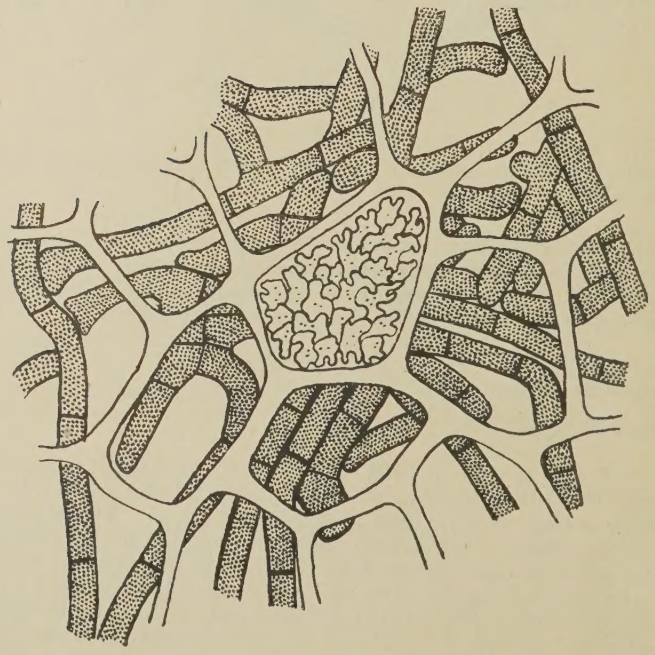


Fig. 8.

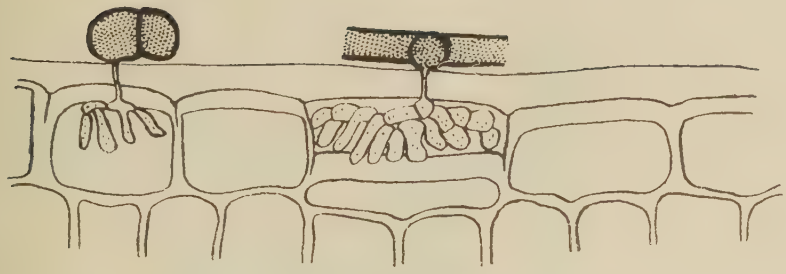


Fig. 9.

Lembosia piriensis Doidge.

in Bothalia I, p. 78 (1922).

In this species each of the scattered hyphopodia forms a single coralloid haustorium in the epidermis beneath, at first filling a single cell of the host, but later in some cases extending into one or two adjacent cells. There is no other penetration of the host visible in our preparations, and the fungus is correctly placed in the genus *Lembosia*. Figure 10

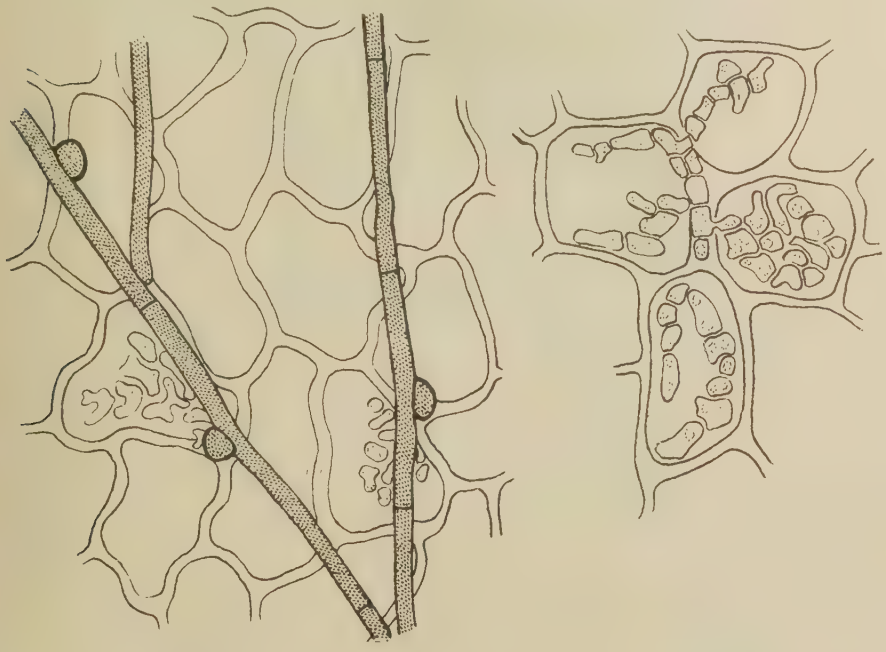


Fig. 10.

shows a surface view of the mycelium with haustoria in the epidermis below, on the right a haustorium extending over four epidermal cells is drawn. Figure 11 shows haustoria and mycelium in an older part of the colony, viewed from below the epidermis, while Fig. 12 shows the haustoria in transverse section.

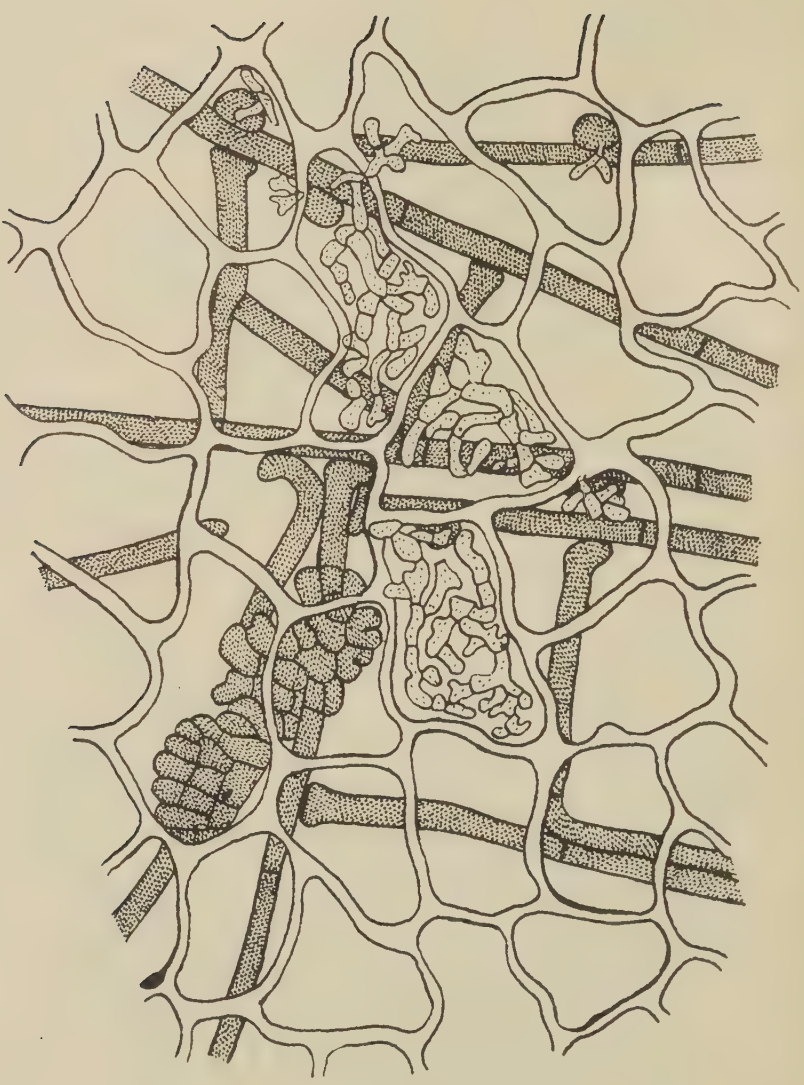


Fig. 11.

Fig. 12.

Lembosia durbana van der Byl.

in South African Journ. Sci., XXVI, p. 319 (1926).

Beneath the centre of the colony, where the external mycelium is densely aggregated, and from which it radiates outwards more or less regularly, there is an extensive plate of subhyaline to hyaline mycelium beneath the cuticle, connected by fairly numerous pegs direct through the cuticle to the external hyphae. From the subcuticular plate hyphae descend between the cells of the epidermis to form a similar plate of small cells between

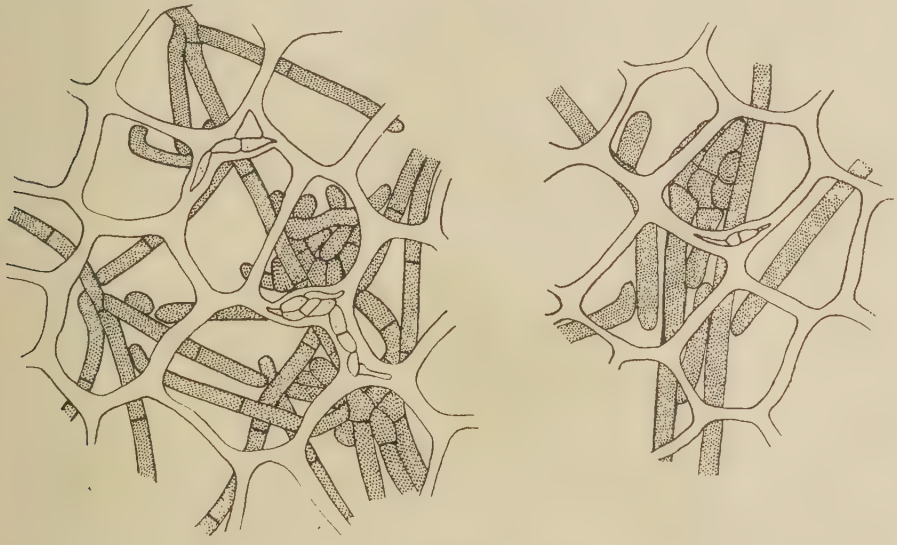


Fig. 13.

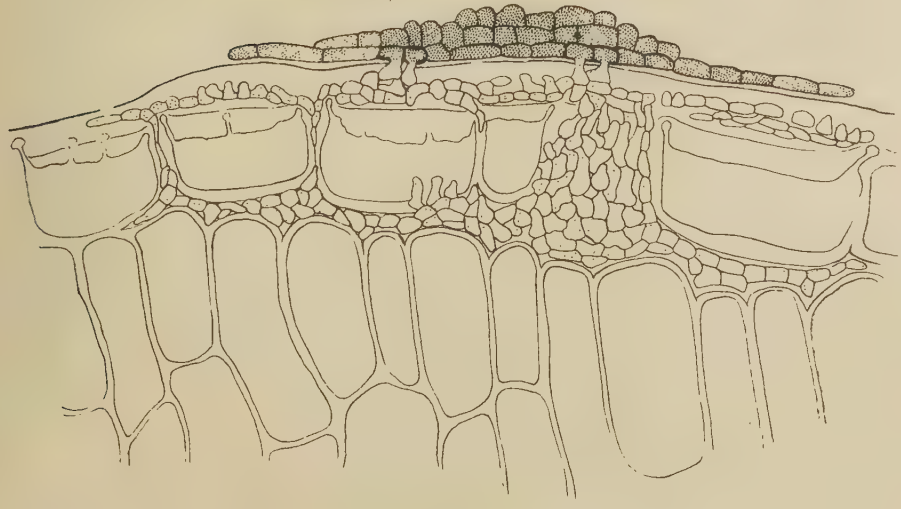


Fig. 14.

the epidermis and palisade layers of the leaf; no deeper penetration of these hyphae has been found. There are no haustoria in the host cells, and the internal mycelium is completely intercellular. At scattered points in other parts of the colony, beneath the mycelial aggregations which surround some of the hyphopodia, smaller patches of internal mycelium are formed, usually without the subcuticular plate but with the hyphae descending between the epidermal cells to form small patches of mycelium above the palisade layer. It is possible that these secondary penetrations of the host originate from the hyphopodia but in our preparations it was not possible to establish this point, as each hyphopodium is surrounded by an irregular plate of mycelial branches, as shown in Fig. 13. The epidermal cells have a series of pits extending up towards the leaf surface, which are omitted from Fig. 13 for the sake of clarity, though shown in transverse section in Fig. 14, cut through the centre of the colony.

The presence of an extensive internal mycelium in this species, in the writer's opinion, removes it from *Lembosia*, and it would be best placed as **Echidnodes durbana** (v. d. Byl) comb. n., though it shows transition towards the true ectoparasitism of *Lembosia* and *Asterina*, in so far as the hyphopodia being functional.

SOME SOUTH AFRICAN PESTALOTIA SPECIES.

By Elaine M. Laughton.

Fungi belonging to the genus Pestalotia, occurring on indigenous South African host plants, have received slight attention, largely because, thus far, they are not known to be of any great economic importance. On the other hand, some well-known parasitic species of Pestalotia, which have been introduced with their hosts, occur wherever the host plant is present abundantly. These fungi may cause extensive damage, particularly in nurseries.

Most of the Pestalotia species, of which material is to be found in the Cryptogamic Herbarium at Pretoria, occur on forest trees and shrubs, although some have been collected in coastal scrub or in the open country. The acervuli of these fungi occur on dry leaf areas which are grey, brown or almost white and usually have a well-defined margin. Not infrequently the fungus is associated with other fungi or with injury caused by leaf miners.

On the following pages, species of Pestalotia recognised on cultivated and on indigenous plants in South Africa are listed in alphabetical order; descriptions are given of those occurring on indigenous plants.

Pestalotia Aloës Trinch.

Trinchieri, Rend. Accad. Sc., Napoli XLVIII, fasc. 8–12, Extr. p. 8.
Sacc. Syll. Fung. XXII; 1227. du Plessis, S. Afric. Journ. Sci. XXX (1933), 209.

Acervuli rather large, gregarious, veiled by the torn epidermis, sublenticular, black, 171–245 μ diam., 61–122 μ high. Conidia very numerous, fusoid or subpyriform, sometimes curved, 4-septate, not constricted at the septa or very slightly so, 19·5–24·5 $\times$ 4·5–7 μ. The three median cells thicker, fuscous; terminal cells minute, the apical cell bearing three rather long, filiform, divaricate setae, 17–24·5 μ long and 1 μ thick, acute at the apex; basal cell produced into a hyaline pedicel, 4·5–9·5 $\times$ 1 μ.

on *Aloe* spp., leaves, Stellenbosch. *du Plessis* (Stell. 813), and *Dippenaar* (Stell. 900).

The above species was recorded by du Plessis (l.c.) on leaves of Aloe spp.; unfortunately the specimens quoted are not to be found in the herbarium of the Stellenbosch-Elsenburg College of Agriculture, and it has not been possible to study the fungus nor to make drawings of the spores. The description, taken from the Sylloge Fungorum (l.c.) is included for the sake of completeness. The species was originally described by Trinchieri on dry scapes of *Aloe virens* in southern Italy.

Pestalotia Burchelliae Laughton sp. nov.

Maculae amphigenae, parvae, rotundatae v. majusculae, irregulares, avellaneae, linea brunnea limitatae. Acervuli epiphylli, sparsi, punctiformes, pusilli, 75–150 μ diam., epidermide convexa tecti dein erumpentes. Conidia fusoidea v. clavato-fusoidea, recta v. curvata, 4-septata, vix ad septa constricta, 22–25 μ longa, cellulis tribus mediis 15–17·5 μ longis, 7·5–8 μ latis, infimis olivaceis, duabus superioribus obscurioribus; cellulis extimis hyalinis, apicali obtuse conoidea, 4–5 μ longa, setis 3, raro 4, divergentibus, nonnunquam ramosis, 20–30 μ longis ornata, basali conoidea, 4–5 μ longa, in pedicellum 5–7 μ longum hyalinum abeunte.

Hab. in foliis viventis *Burchelliae bubalinae*, Knysna, leg. F. S. Laughton, 34912.

Leaf spots small, more or less circular, or larger, spreading, avellanous to wood brown with snuff brown border. Acervuli epiphyllous, minute, black, punctiform, scattered irregularly, 75–150 μ diam., formed under the epidermis which becomes convex over the developing acervulus, ca. 50 μ high, becoming conical when ruptured in the centre.

Conidia fusoid or clavate-fusoid, tapering to the base, straight or curved, 5-celled, 22–25 μ long, very slightly constricted at the septa. The three coloured median cells 15–17·5 × 7·5–8 μ, rarely 6–7 μ or 8·5–9 μ broad, the two upper buffy-brown to olive brown, the lowest, deep to dark olive buff; the central cell is sometimes the darkest. Basal cell subhyaline, conical, 4–5 μ long, tapering to the pedicel, which is slender, hyaline, straight, 5–7 μ long. Apical cell obtusely conical, 4–5 μ long, hyaline, bearing three, rarely four, widely divergent setae, 20–30 μ long, mostly about 25 μ long, occasionally branched.

on *Burchellia bubalina* (Linn. f.) Sims, common on living leaves at the edge of the forest, Garden of Eden Nature Reserve, Knysna, 6th May, 1945, *F. S. Laughton*, 34912.

This fungus is often associated with insect injury, apparently caused by a "leaf miner."

Pestalotia caffra Syd.

H. and P. Sydow, Ann. Myc. 12 (1914) 266. Guba, Mycologia 24 (1932) 362.

Acervuli amphigenous, mostly epiphyllous, irregularly distributed on rather large, dry leaf spots, which are irregular in outline and greyish white in the centre with a raised snuff-brown border. Acervuli circular in outline, subepidermal, pushing up the epidermis in the form of a cone; then becoming erumpent, surrounded by the torn epidermis, which collapses, the spores being distributed over the matrix in a sooty-looking mass.

Conidia broadly clavate, five-celled, not constricted at the septa, 22–28 μ long; the three central coloured cells 16–19 × 8–11 μ, the two upper warm sepia, the lowest pale, avellanous; basal cell subhyaline, conical, 5–6 μ long, tapering to the pedicel, which is erect, 2–7 μ long; apical cell rather short, obtusely conical, bearing three, widely divergent, rather strong setae, 20–26 μ long, 1 μ thick at the point of divergence and tapering to the tips.

on leaves of *Mimusops caffra* E. Mey., Isipingo, *Doidge*, 6630.

Pestalotia Cassinis Laughton sp. nov.

Maculae amphigenae parvae vel majusculae usque 1·5 cm. diam., in pagina folii superiore cinerascentes, linea atro-brunnea cinctae, in inferiore dilute brunneae margine rufo-brunneo limitatae. Acervuli amphigeni, plerumque epiphylli, sparsi, atri, punctiformes, primo epidermide conico-elevante tecti dein erumpentes, lenticulares, 250–300 μ diam. Conidia fusoidea, 4-septata, recta, rarius leniter curvata, ad septa haud vel leniter constricta, 20–25 μ longa, cellulis tribus mediis primo pallide olivaceo-brunneis, deinde duabus superioribus paulum obscurioribus, 12·5–15 × 5·5–7 μ, plerumque 6 μ rare usque 7·5 μ latis, cellula basali conoidea, 3–4 μ longa, in pedicellum brevem 2–8 μ longum abeunte, apicali conoidea setis 3 plus minus divergentibus, 10–20 μ longis coronata.

Hab. in foliis vivis *Cassinis sphaerophyllae*, Brenton, Knysna, leg. E. M. Laughton, 34916.

Leaf spots irregular in outline, small or up to 1·5 cm. diam., often marginal; on the upper side of the leaf smoke-grey or pale smoke-grey, with very narrow blackish brown border, with age the epidermis often becomes wrinkled and papery and breaks away; on the lower side cinnamon drab, with a broader zone of warm sepia at the margin.

Acervuli epiphyllous, occasionally also hypophyllous, scattered, black, punctiform, developing under the epidermis which becomes raised and conical, then ruptures and remains partly veiling the spores. Acervuli lenticular, 250–300 μ diam., 100–200 μ high in the centre.

Conidia fusoid, five-celled, straight, very rarely somewhat curved and inequilateral, not constricted at the septa or very slightly so, 22–25 μ long. The three central coloured cells at first pale to deep olive-buff, concolorous; later the two upper cells are darker, buffy-brown, or the central cell, which is the broadest is also the darkest, buffy-brown, and the uppermost dark olive; coloured cells 12·5–17 × 5·5–7 μ, mostly 15 × 6 μ, rarely up to 7·5 μ broad; basal cell hyaline, conical, 3–4 μ long, tapering to the short pedicel, which is 2–8 μ long; apical cell narrow-conical, hyaline, with a crest of three slender setae, 10–20 μ long, mostly ca. 15 μ long, which may be ascending or more or less divergent.

on *Cassine sphaerophylla* O. Ktze., fairly common on living leaves, usually in coastal scrub, Brenton, Knysna, *E. M. Laughton*, 34916 ; Buffalo Bay Forest, *E. M. Laughton*, 34914.

Pterocelastrus tricuspidatus Sond., Knysna, *E. M. Laughton*, 34915.

Pestalotia disseminata Thuem.

v. Thuemen, Inst. Rev. Sci. Coimbra 28 (1880) 501 ; Guba, Mycologia 24 (1932) 365.

on *Eucalyptus diversicolor* F. Muell., stems of seedlings, Kruisfontein, *E. M. Laughton*, 34911.

Eucalyptus Lehmanni Preiss., dead leaves, Fort Cunynghamme, *D.F.O.*, 23701.

Eucalyptus sp., dead leaves, Blauwkrantz, Storms River, *D.F.O.*, 11388.

Pestalotia Encephalartos Laughton sp. nov.

Maculae pallide olivaceae ex apice foliolorum late extensae et saepe magnam folioli partem occupantes, margine prominule castaneo- vel atrobrunneo limitatae. Acervuli epiphylli, gregarii, densiuscule dispersi, oblongi, usque 500 μ longi, nonnunquam coalescentes, epidermide elevata diu tecta, demum erumpentes et ea lacerata cincti. Conidia clavata, recta v. leniter curvata, 18–25 μ longa, 4-septata, ad septa leniter constricta ; cellulis tribus mediis 12·5–17 × 6–9 μ, olivaceo-brunneis quarum duabus superioribus obscurioribus vel cellula media tantum obscuriore, cellula basali hyalina conoidea, 4–5 μ longa ad pedicellum rectum v. curvatum 6–7 μ longum attenuata, apicali hyalina obtuse conoidea, breviuscule, setis 3, rarius 2, crassiusculis divaricatis, 17–25 μ longis instructa.

Hab. in foliis *Encephalartos villosi*, Malvern, 861.

Acervuli in rather dense groups on discoloured leaf areas, which usually spread from the tip of the leaflet, extending downwards until the greater part of the whole of the leaflet is involved. These areas are dark olive buff to isabella colour, with a raised border which is snuff-brown or chestnut-brown to blackish-brown.

Acervuli elongated, long covered by the raised epidermis, then erumpent, surrounded and partly veiled by the torn epidermis, oblong, up to 500 μ long, often becoming coalescent.

Conidia straight or slightly curved, 18–25 μ long, 4-septate, slightly constricted at the septa ; the three median coloured cells 12·5–17 × 6–9 μ, the two upper darker, snuff-brown to bister, the lowest avellanous to deep olive-buff, or only the central cell darker ; basal cell conical, 4–5 μ long, tapering to the pedicel which is short, straight or curved, ca. 6–7 μ long ; apical cell bluntly conical, rather short, delicate, bearing three, rarely two, divergent setae, 17–25 μ long.

on *Encephalartos villosus* (Gaertn.) Lem., leaves, Malvern, 861 ; Durban, *Pole Evans*, 2131.

Stangeria eriopus Nash, leaves, Mountain Rise, Pietermaritzburg, *Doidge*, 864.

In collections 2031 and 864 most of the conidia appear to be immature ; they are uniformly paler and more slender, 5–6 μ broad ; only a few typical, mature conidia were seen.

Pestalotia funerea Desm.

Desm., Ann. Sc. Nat. Bot. II, 19 (1843) 335–336. Guba, Phytopath. 19 (1929) 202.

on *Cedrus Deodara* Loud., Cedara, 5172.

Cupressus arizonica Greenl., Ermelo, *District Forest Officer*, 28790.

Cupressus torulosa Don., Estcourt, *Erxleben*, 28535.

Juniperus virginiana Linn., Cedara, 2246.

Juniperus sp., Richmond, *Gordon*, 29920.

Pinus halepensis Mill., without locality, 23216 ; Fort Cunynghame, 700.

Pestalotia Gossypii Hori.

ex Thuruda, Journ. Plant Protection (1917) 27 ; Tanaka, Mycologia XI (1919) 154 ; Sacc. Syll. Fung. XXV ; 603.

on *Gossypium* sp., stems, Mbabane, Swaziland, *Gov. Vet. Officer*, 14646.

Pestalotia Guepini Desm.

Desm. Ann. Sci. Nat. Bot. II, 13 (1840) 182–184.

Coryneum Camelliae Massee, Grev. 20 (1891) 8 ; Kew Bull. 1898, 106–109.

Pestalotia Karstenii Sacc. & Syd., Sacc. Syll, Fung. XIV : 1030.

Pestalotia inquinans Karst., Hedwigia 30 (1891) 301 ; Sacc. Syll. Fung. X : 487 ; not Cooke and Harkness, Grev. 12 (1884) 94.

on *Camellia japonica* Linn., leaves, Paarl, *S. J. du Plessis* (Stell. 618), 34585.

Pestalotia Laughtonae Doidge sp. nov.

Maculae amphigenae irregulares, 1–2 cm. diam. v. majusculae, in pagina folii superiore avellaneae margine brunnea limitatae, in inferiore obscuriores. Acervuli numerosi, epiphylli, gregarii, atri, punctiformes, subepidermici, lenticulares, 300 550 μ rarius 400–450 μ diam., 100–150 μ alto, epidermidem centro perforatam convexulo elevantes. Conidea ovoidea, recta v. valde inaequilatera seu gibbosa, 4-septata, ad septa haud constricta, 22·5–25 μ longa ; cellulis tribus mediis 15–17 × 9–11 μ plerumque 15 × 10 μ, infimis dilute brunneis duabus superioribus valde obscurioribus demum opacis, sub-atris ; cellula apicali hyalina subcylindracea, setis tribus divergentibus, 20–25 μ longis ornata ; basali subhyalina turbinata, pedicello hyalino 5–10 μ longo suffulta.

Hab. in foliis *Cassinis sphaerophyllae*, Knysna, leg. E. M. Laughton, 35145.

Leaf spots irregular in outline, 1–2 cm. diam. or larger, often spreading from the leaf margin ; on upper leaf surface avellanous with raised line at margin, which is Natal brown ; on the underside wood-brown, usually without darker margin. Acervuli closely and evenly set over the whole leaf spot, discrete, not coalescent, black, punctiform, erumpent by means of a central pore, which may be more or less round, or become radiating through the formation of three or more cracks, running out from the central pore.

Acervuli epiphyllous, subepidermal, the epidermis becoming raised and slightly conical over the acervulus, later becoming ruptured in the centre. Acervuli lenticular, usually 300–350 μ diam., occasionally 400–450 μ, about 100 μ or up to 150 μ high in the centre.

Conidia ovoid, straight or inequilateral and gibbous, 4-septate, not constricted at the septa, 22·5–25 μ long. The three central coloured cells 15–17·5 × 9–11 μ, mostly 15 × 10 μ ; the two upper olive-brown to clove-brown, later opaque and almost black ; the lowest drab in colour. Apical cell hyaline, cylindrical, bearing three, rarely two, rigid, widely divergent setae ; most commonly these are horizontal and almost at right-angles to the axis of the conidium. Basal cell subhyaline, turbinate. Pedicel hyaline, slender, 4–6 μ long.

on *Cassine sphaerophylla* O. Ktze. Brenton, Knysna, in coastal scrub forest, *E. M. Laughton*, 35145 ; often associated with *Pestalotia Cassinis* Laught.

Pterocelastrus tricuspidatus Sond., Knysna, *E. M. Laughton*, 35146.

Pestalotia Laurophylli Laughton sp. nov.

Maculae amphigenae, majusculae, irregulares, usque 1·5 cm. diam., in pagina folii superiore cinerascentes linea brunnea limitatae, in inferiore dilute brunneae. Acervuli sparsi, amphigeni, plerumque epiphylli, atri, punctiformes, 175 300 μ diam., primo epidermide tecti, demum erumpentes. Conidia fusoidea, 4-septata, recta, interdum paululo inaequilatera, ad septa haud constricta, 20–25 μ longa ; cellulis tribus mediis 14–17·5 μ longis,

7·5–9 μ latis, rarius usque 10 μ latis, infimis olivaceis, duabus superioribus obscurioribus, subopacis ; cellulis extimis hyalinis, apicali sub-cylindracea in setis 2-3, divergentibus, 17·5–25 μ longis abeunte, basali conoidea in pedicellum brevem, 2–10 μ longum desinente.

Hab. in foliis viventis *Laurophylli capensis*, Knysna, leg. E. M. Laughton, 34913.

Leaf spots large, up to 1·5 cm. diam., irregular in outline, on the upper leaf surface pale smoke-grey bordered with clove-brown, on the under-surface Natal brown to olive-brown.

Acervuli scattered, amphigenous, mostly epiphyllous, black, punctiform, 175–300 μ diam., 70–100 μ high in the centre, developing under the epidermis, then erumpent.

Conidia ovoid or broadly ellipsoid, erect, rarely somewhat asymmetrical, 4-septate not constricted at the septa, 20–25 μ long. The three median coloured cells 14–17·5 μ long, 7·5–9 μ, rarely up to 10 μ broad, the two upper bister, thick-walled, semi-opaque, the lowest dark olive-buff. Apical cell hyaline, short, sub-cylindrical, often indistinct, bearing at its extremity 2–3 setae, 17·5–25 μ long, rather stout, ca. 1 μ thick at the base and tapering somewhat upwards, two setae oppositely divergent, the third, when present, often vertical. Basal cell subhyaline, tapering downwards to the hyaline pedicel, which is 2–10 μ long, usually ca. 7 μ long.

on *Laurophyllus capensis* Thunb., common on living leaves at the edge of the forest or in the "fynbos", Garden of Eden Nature Reserve, Knysna, 6th May, 1945, *E. M. Laughton*, 34913.

Pestalotia macrochaeta (Speg.) Guba.

Guba, Mycologia 24 (1932) 369.

Pestalotia funerea Desm. var. *macrochaeta* Speg. Anal. Mus. Nac. Buenos Aires III (1911), 412. Sacc. Syll. Fung. XXII : 1226.

on *Pinus caribaea* Morelet, Dukuduku, *District Forest Officer*, 27660.

Pinus patula Schiede, Spitzkop, Cape, *District Forest Officer*, 30447, 32073.

Pinus pinaster Ait., Cedara, *Fisher*, 2100.

Pinus radiata Don., Zwartkop, *Hayter*, 7767.

Pinus spp. undet., Komgha, *Crewe*, 27812 ; Maritzburg, *Kelly*, 11868.

Pestalotia Mangiferae P. Henn.

P. Hennings, Ann. Mus. Congo Belge V, Fasc. 11 (1907) 120.

Sacc. Syll. Fung. 22 : 1223 ; Mundkur and Kheswalla, Mycologia 34 (1942), 309.

Pestalotia funerea Desm. forma *Mangiferae* Saccardo, Atti Istit. Veneto Sci. VI, c (1884) 461.

Pestalotia virgatula Kleb., Mykol. Zentralblaat 4 (1914) 13 ; Guba, Phytopath. 19 (1929), 222.

Pestalotia pauciseta Syd. (nec. Sacc.) Ann. Myc. 15 (1917), 262.

on living leaves of *Mangifera indica* Linn., Barberton, 1911.

Pestalotia Micheneri Guba.

Guba, Mycologia 24 (1932), 371.

on leaves of *Araucaria Cunninghamii* Sweet, Eshowe, District Forest Officer, 15461.

Pestalotia Milletiae Laughton sp. nov.

Maculae utrinque conspicuae, rotundatae sparsae, quoad magnitudinem variabiles vel e margine vel ex apice foliolorum late extensae et saepe dimidiam folioli partem occupantes, albescentes, margine atrobrunneo limitatae. Acervuli epiphylli irregulariter sparsi, puncti-

formes, rotundati v. elliptici, primo epidermide et hypodermide tecti dein erumpentes, 200–400 μ diam. Conidia ellipsoidea, 19–22 μ longa, 4-septata, haud vel vix constricta, recta v. leniter curvata, cellulis tribus mediis 14–17·5 × 7–8 μ, olivaceo-brunneis quarum duabus superioribus obscurioribus; cellula basali conoidea, subhyalina 2–3 μ longa in pedicellum tenuem erectum 4–5 μ longum attenuata; apicali hyalina obtuse conoidea, setis 2–3 tenuibus 10–15 μ longis ornata.

Hab. in foliis viventis *Milletiae sp.*, in sylvis, Eshowe, Zululand, leg. E. M. Laughton, 33437.

On leaf spots, visible on both sides of the leaf, whity-brown (nearest pale olive-buff) with clove-brown to black margin; the leaf spots may be scattered, more or less circular in outline, and variable in size, or, spreading from the margin or apex of the leaflet, cover larger areas, involving up to half the surface of the leaflet.

Acervuli epiphyllous, irregularly scattered, punctiform, round to elliptical in outline, 200–400 μ diam., developing under epidermis and hypodermis, then erumpent, or pseudopycnidial and up to 300 μ deep.

Conidia ellipsoid, straight or slightly curved, 19–22 μ long, 4-septate, not constricted at the septa, or barely so; the three median coloured cells 14–17·5 × 7–8 μ, the two upper rather darker than the lowest, or frequently the central cell, which is the broadest, is also the darkest in colour (olive-brown), the uppermost slightly paler and the lowest the palest (buffy-brown to deep olive-buff). Basal cell conical, subhyaline, 2–3 μ long, tapering into a slender, erect pedicel 4–5 μ long. Apical cell bluntly conical, hyaline, bearing 2–3 slender, delicate setae, 10–15 μ long.

on *Milletiae* sp., probably *Milletia Sutherlandi* Harv., living leaves, Eshowe Forest, Zululand, *E. M. Laughton*, 33437.

Pestalotia neglecta Thuem.

v. Thuemen, Inst. Rev. Sci. Coimbra II, 27 (1880), 386.

Sacc. Syll. Fung. III: 788. Guba, Mycologia 24 (1932), 375.

Pestalotia funerea Desm. var. *Euonymi-japonici* Thuemen Myc. Univ. 884 (1887) nom. nud.

on leaf spots on green leaves of *Euonymus japonica* Linn. f., Johannesburg, *Walter Webber*, 34922. Associated with other fungi.

Pestalotia Ocoteae Laughton sp. nov.

Maculae fructicolae, sparsae, luteo-brunneae, margine atro limitatae vel effusae saepe totam fructus superficiem occupantes. Acervuli sparsi, minuti, primitus epidermide conico-elevata tecti, demum erumpentes et ea fissa cincti, rotundati v. elongati, 240–275 μ diam. Conidia fusoidea, recta v. leniter curvata, 4-septata, ad septa haud vel vix constricta, 22·5–27·5 μ longa, cellulis tribus mediis 15–18 μ longis, olivaceis, duabus superioribus leniter obscurioribus; cellulis extimis hyalinis conoideis, apicali setulis 2–3 divaricatis tenuibus 15–25 μ longis ornata, basali 3–4 μ longa in pedicellum brevem rectum v. curvatum 5–7 u longum desinente.

Hab. in fructibus immaturis *Ocoteae bullata*, in sylvis, Deepwalls, Knysna, leg. J. F. V. Phillips, 17824.

Acervuli developing on discoloured areas on the fruit, which are either few, scattered, buffy-brown with dark brown or black border, or effuse, the whole epicarp becoming discoloured buffy-brown.

Acervuli scattered, subepidermal, then erumpent, round or somewhat elongated, 240–275 μ diam., up to 100 μ high in the centre. The epicarp of the fruit has a thick cuticle, 10–15 μ thick, and below the epidermis a layer of sclerenchyma. Acervuli develop between the sclerenchyma and the epidermis, causing a conical elevation of the latter. The increasing pressure of the developing spores ruptures the epidermis, which remains surrounding and partly veiling the acervuli.

Conidia fusoid, straight or slightly curved, 4 septate, 22·5–27·5 μ long, not constricted at the septa or slightly so, but older spores may be more deeply constricted. The three central coloured cells are 15–18 × 6–7·5 μ, the two upper buffy-brown, the lowest somewhat paler. Terminal cells hyaline, conical, the apical cell bearing 2–3, usually 3, slender, hyaline, divaricate setae 15–25 μ long; basal cell 3–4 μ long, tapering into a short pedicel, which is straight or curved, 5–7 μ long.

on immature fruits of *Ocotea bullata* E. Mey. (Stinkwood) Deepwalls Forest, Knysna, *J. F. V. Phillips*, 17824.

Pestalotia palmarum Cooke.

Cooke, Grevillea 3 (1875), 115 and 4 (1876), 102.

Guba, Phytopath, 19 (1929), 210.

on *Cocos nucifera* Linn., leaves, Lourenco Marques, *Hardenburg*, 22559; on fruit, Inhaci Is., *Mogg*, 34154.

Phoenix reclinata Jacq., Lourenco Marques, *Howard*, 187.

Pestalotia Pelargonii Laughton sp. nov.

Maculae sparsae, rotundatae, usque 5 mm. diam., in pagina folii superiore cinerascentes, margine avellaneo limitatae, inferiore tomentosa obscurae. Acervuli hypophylli, sparsi, punctiformes, aterrimi, usque 250 μ diam., primum epidermide tecti dein erumpentes. Conidia ellipsoidea v. ovoidea, 4–septata, recta raro inaequilatera, ad septa haud constricta, 20–25 μ longa; cellulis tribus mediis 14–17·5 × 7·5–9·5 μ, infimis olivaceis, duabus superioribus obscurioribus, semiopacis; cellula apicali hyalina conoidea, setis 2–4 plerumque 3 divergentibus ornata, basali brevi in pedicellum 5–7 μ longum abeunte.

Hab. in foliis viventis *Pelargonii cordati*, Knysna, leg. E. M. Laughton, 34918.

Leaf spots scattered, more or less circular in outline, often small, up to 5 mm. diam. on the upper surface of the leaf smoke-grey with avellanous border, indistinct on the under side where they are obscured by the thick tomentum on the leaf surface.

Acervuli hypophyllous, irregularly scattered, punctiform, subepidermal, lenticular up to 250 μ diam.; spores developing in great numbers push up the epidermis in the form of a cone, 90–125 μ high in the centre; the epidermis ruptues over the centre of the acervulus and the masses of dark conidia which emerge lodge amongst the long curved hairs which form the tomentum on the lower leaf surface.

Conidia ellipsoid to ovoid, 4-septate, straight, rarely inequilateral, not constricted at the septa, 20–25 μ long. The three median coloured cells cask shaped, 14–17·5 × 7·5–9·5 μ the two upper olive-brown, semi-opaque, the lowest dark olive-buff. Apical cell hyaline, conical, bearing two to four, usually three, divergent setae, 15–25 μ long. Basal cell rather short, tapering to a straight pedicel 5–7 μ long.

on *Pelargonium cordatum* L'Hérit., on living leaves at the edge of the forest or in the "fynbos", Garden of Eden Nature Reserve, Knysna, 14th May, 945, *E. M. Laughton*, 34918.

Pestalotia Podocarpi Laughton sp. nov.

Maculae albescentes vel avellaneae ex apice foliorum late extensae usque 5 cm. longae, margine prominulo infuscato limitatae. Acervuli epiphylli sparsi v. gregarii nonnunquam coalescentes, majusculi, rotundati v. elliptici, 250–500 μ diam., primo epidermide tecti convexi, usque 170 μ alti, demum erumpentes epidermide fissa cincti. Conidea ovoidea v. late fusoideo-ellipsoidea, saepe inaequilatera seu gibbosa, 20–23 μ longa rarius usque 25 μ longa, ad septa haud vel vix constricta, cellulis tribus mediis 15 (rare 16) × 7·5–10 μ, infimis olivaceis duabus superioribus obscurioribus subopacis, cellulis extimis hyalinis, basali late conoidea, 2·5–4 μ longa, in pedicellum 3·5–7 μ longum producta, apicali obtuse conoidea, setis 3–4, raro 5, 20–30 μ longis divergentibus coronata.

Hab. in foliis vivis *Podocarpi latifolii*, Knysna, leg. E. M. Laughton, 34917.

Acervuli seated on dead areas of leaves, almost white to avellaneous on the upper surface, darker on the underside, with a border of mummy-brown separating them from the living green tissues. These dead areas usually spread from the tips of the leaves and are up to 5 cm. long ; marginal lesions also occur.

Acervuli epiphyllous, scattered or rather closely set and sometimes coalescing, rather large, circular or elliptic in outline, subepidermal, finally erumpent by a longitudinal slit in the epidermis ; in the centre the ruptured epidermis shows white against the dark brown of the covered spore masses. Acervuli 250–500 μ diam., shallow, at first covered by the epidermis, which becomes raised and convex, ca. 75–100 μ high in the centre.

Conidia ovoid or broadly fusoid-ellipsoid, often asymmetrical and distinctly dorsiventral, 20–23 μ long, rarely up to 25 μ long, four-septate, not constricted at the septa, or very slightly so. The three median coloured cells 15 (rarely 16) $\times$ 7·5–10 μ, the two upper bister, rather thick-walled, subopaque, the lowest deep olive-buff. Basal cell conical, 2·5–4 μ long, tapering to the pedicel, which is slender, hyaline, straight, 3·5–7 μ long. Apical cell hyaline, obtusely conical, 4–5 μ long, crowned with 3–4, rarely 5, fairly stout, divergent setae, 20–30 μ long, ca. 1 μ thick at the point of divergence.

on *Podocarpus latifolius* R. Br., on living leaves, common, Garden of Eden Nature Reserve, Knysna, *E. M. Laughton*, 34917.

Pestalotia Psidii Pat.

Patouillard in Bull. Soc. Myc. Fr. 8 (1892), 136, nom. nud. ; Bull. Soc. Myc. Fr. 11 (1895), 232.

Sacc. Syll. Fung. XIV : 1025. Guba, Mycologia 24 (1932), 379.

on fruits of *Psidium Guajava* Linn., Mataffin, *Hall and Sons*, 34090.

Pestalotia Pterocelastri Laughton sp. nov.

Maculae amphigenae, rotundatae vel irregulares, 5–10 mm. diam., interdum majores, in pagina folii superiore cinerascentes margine olivaceo-brunneo limitatae, in inferiore olivaceo-brunneae. Acervuli epiphylli, numerosi, gregarii lenticulares, 200–350 μ diam., 120–165 μ alti, epidermidem centro perforatam convexule elevantes. Conidea fusoidea, 4-septata, basim versus attenuata, interdum curvula v. inaequilatera, ad septa haud vel vix constricta, 25–37·5 μ longa ; cellulis tribus mediis 20–25 $\times$ 9–10 μ, infimis pallide olivaceis, duabus superioribus paulum obscurioribus, cellulis extremis prominentibus, basali anguste conoidea, subhyalina, 6–7·5 μ longa in pedicellum hyalinum 5–10 μ longum desinente, apicali cylindracea, ca. 5 μ longa, setis tribus hyalinis basi crassiusculis sursum attenuatis flexuosis 20–44 μ plerumque ca. 30 μ longis coronata.

Hab. in foliis *Pterocelastri tricuspidati*, Knysna, leg. E. M. Laughton, 35143.

Leaf spots round to irregular, 5–10 mm. diam. or larger, smoke-grey on the upper side of the leaf, with raised margin which is buffy-brown to olive-brown ; wood-brown on the under side.

Acervuli epiphyllous, numerous, gregarious, lenticular, at first covered by the slightly convex epidermis, sometimes small, but usually larger when mature, 200–350 μ diam., 120–165 μ high in the centre ; the epidermis ruptures in the centre, forming a pore which is usually round but sometimes elongated or angular ; black, sooty masses of spores emerging spread over the matrix.

Conidia 4-septate, long fusoid, tapering to the base, straight or slightly curved and inequilateral, not constricted at the septa or slightly so, 25–37·5 μ long, often 30–34 μ long. Median cells guttulate, the two upper buffy-brown, the lowest olivaceous, 20–25 $\times$ 9–10 μ. End cells rather large ; the apical cell cylindrical ca. 5 μ long, bearing a crest of three or sometimes two, long, flexuous setae 20–44 μ long, mostly ca. 30 μ long, ca. 1·5 μ thick at the base and tapering upwards ; basal cell subhyaline, narrow conical, 6–7·5 μ long, tapering into a slender pedicel 5–10 μ long.

on leaves of *Pterocelastrus tricuspidatus* Sond., on young trees in the "fynbos" on the southern slope of the town hill, Knysna, *E. M. Laughton*, 35146.

This species is often associated on the same leaves, and even on the same leaf spots with *Leptosphaeria Pterocelastri* Doidge ; *Pestalotia Cassinis* Laughton and *P. Laughtonae* Doidge are also to be found on leaves of *Pterocelastrus tricuspidatus* in the same collection.

Pestalotia Pterocelastri is very similar to *P. Planimi Vize*, which occurs, associated with other fungi, on weathered leaves of another plant belonging to the Celastraceae, *Euonymus japonicus* Linn., in California and in Portugal [Guba, Mycologia 24 (1932) p. 377.]

It differs in the form of the acervuli, which are lenticular and not subglobose and in the frequently slightly curved and asymmetrical conidia. Conidia of *P. Planimi* are described and figured as straight, erect. Setae in *P. Planimi* are figured as thick throughout, slightly distended at the tips ; those of *P. Pterocelastri* are thick at the base, tapering upwards and becoming slender near the tips.

Pestalotia quercina Guba.

Guba, Mycologia, 24 (1932), 379.

on *Quercus* sp., on old weathered leaves of seedlings, Irene, Doidge, 2270, 2271.

Pestalotia Rapaneae Laughton sp. nov.

Maculae sparsae, usque 1·5 cm. diam., rotundatae v. irregulares, cinerascentes, margine olivaceo-brunneo limitatae. Acervuli epiphylli, sparsa, subepidermici, rotundati, 175–210 μ diam., Conidia ovoidea v. late fusoideo-ellipsoidea, saepe inaequilatera, 22–27·5 μ longa, 4-septata, ad septa haud constricta ; cellulis tribus mediis 15–19 × 9–10 μ, brunneis, subopacis, quarum 2 superioribus obscurioribus et majusculis, extimis hyalinis, basali conoidea ca. 4 μ longa, in pedicellum rectum v. leniter curvatum 4–5 μ longum producta, apicali brevi cylindracea v. obtuse conoidea, setis 2–3, plerumque 3, rectis, divergentibus, 15–26·5 μ longis ornata.

Hab. in foliis viventis *Rapaneae melanophleos*, Storms River, leg. Doidge, 17171.

Acervuli on dead, discoloured areas of the leaf, which are often near leaf margins, smoke-grey to light drab in the centre with olive-brown border, more or less circular except near the margin of the leaf, where they are irregular, up to 1·5 cm. diam.

Acervuli epiphyllous, scattered, more or less circular in outline, subepidermal, 175–210 μ diam.

Conidia ovoid or broadly fusoid-ellipsoid, often asymmetrical with one side almost straight and the other convex, 22–27·5 μ long, 4-septate, not constricted at the septa. Central coloured cells 15–19 × 9–10 μ ; the two upper larger, clove-brown, subopaque, the lowest paler, buffy-brown. Extreme cells hyaline ; apical cell short, often rather indistinct, cylindrical or truncate conical, bearing at its extremity 2–3, mostly 3, usually straight, divergent setae, 15–26·5 μ long, two of which often form a very wide angle ; basal cell conical, about 4 μ long, tapering to a short pedicel, which is hyaline, straight or slightly curved, 4–5 μ long.

on living leaves of *Rapanea melanophleos* Mez., Storms River, Humansdorp District, *Doidge*, 17171 ; Garden of Eden, Knysna, *E. M. Laughton*, 34433, 34911.

Pestalotia Trichocladi Laughton sp. nov.

Maculae effusae, fuscae, indeterminatae. Acervuli epiphylli, minuti, sparsi, rotundati v. leniter elongatae, primum epidermide tecti dein erumpentes epidermide fissa cincti et subvelati, 175–250 μ diam., centro 75–85 μ alti. Conidia fusoidea, recta v. subcurvata, 4-septata, ad septa leniter constricta, 30 37·5 μ longa, cellulis tribus mediis brunneis, aequaliter coloratis vel duabus superioribus leniter obscurioribus, 20–25 × 7·5–9 μ, cellula basali conoidea v. turbinata, subhyalina 4 6 μ longa in pedicillum hyalinum 6–12 μ longum attnenata, apicali hyalina cylindracea, 5–7·5 μ longa, setis 2–4, plerumque 3, 45–60 μ longis, late divergentibus ornata.

Hab. in foliis viventis *Trichocladi criniti*, in sylvis, Storms River, leg. Doidge, 17169.

Acervuli epiphyllous, on large, indeterminate, discoloured areas, which are usually marginal or along the midrib of the leaf. Acervuli minute, scattered, circular to elliptic in outline, developing under the epidermis, which ruptures and reamains surrounding and partly veiling the mass of spores, 175–250 μ diam., 75–85 μ high in the centre.

Conidia fusoid, straight or slightly curved, tapering towards the base, 4-septate, 32–37·5 μ long, slightly constricted at the septa. The three median coloured cells buffy-brown, rather thick-walled, equally coloured, or the lowest slightly paler, 20 25 × 7·5–9 μ. Basal cell conical or turbinate, straight or curved, 4–6 μ long, slightly tinted, olive-buff, tapering downwards into the erect pedicel, which is hyaline, 6–12 μ long. Apical cell hyaline, cylindrical, 5–7·5 μ long, bearing 2–4, usually 3, rather stout, widely divergent setae, 45–60 μ long, ca. 1·25 μ thick at the point of divergence and tapering towards the tips.

on living leaves of *Trichocladus crinitus* Pers., Storms River, *Doidge*, 17169 and *D. J le Roux*, 34307.

Pestalotia Watsoniae Verw. et Dipp.

Verwoerd and Dippenaar, S. Afric. Journ. Sci. 27 (1930), 327.

Leaf spots round to elliptic in outline, 4–7 mm. diam. or spreading irregularly, especially along the leaf margins, vinaceous buff in the centre, becoming paler with age, margin darker, army-brown to sorghum-brown.

Acervuli amphigenous, black, punctiform, scattered, deeply immersed in the mesophyll of the leaf, then erumpent, cupulate, 120–150 μ diam., 120–200 μ deep, the more shallow acervuli being situate over a vein.

Conidia ellipsoid or ovoid, occasionally asymmetrical, 17·5–22·5 μ long, 3-septate, not constricted at the septa or slightly so. The two median coloured cells at first dark olive-buff then buffy-brown, 12·5–16 × 7·5–9 μ, thick-walled, wall 1–1·5 μ thick, equally coloured, and approximately equal in size. Basal cell subhyaline, conical, 2·5–4 μ long, tapering into a pedicel which is deciduous, hyaline, delicate, ca. 1·5 μ thick and up to 30 μ long. Apical cell hyaline, delicate, obtusely conical; setae usually 4–5, occasionally 3, rarely 2, hyaline, widely divergent, sometimes branched, 15–30 μ long.

on leaves of *Watsonia rosea* Ker. var. *alba*, Bot. Gard., University of Stellenbosch, *Verwoerd* (Stell. 931), 34586.

Pestalotia Zahlbruckneriana P. Henn.

in A. Zahlbruckner, Plantae Pentheriana, Ann. K. K. Naturhist, Hofmus. Wien 15 (1900) 3. Sacc. Syll. Fung. XVI: 1017.

Acervuli epiphyllous, scattered or sub-gregarious, at first pulvinate, covered by the pale or greyish epidermis, then erumpent, black, 0·5–1 mm. diam.

Conidia clavate-fusoid, straight or curved, 4-septate, 17–20 μ long, 6–8 μ broad. The three median, coloured cells olivaceous or fusco-olivaceous. Extreme cells hyaline, papilliform, the apical cell bearing 3 setae, which are hyaline, 15–21 μ long and 0·5 μ thick. Pedicel hyaline, 8–15 μ long and 1–1·5 μ thick.

on the inflorescence of *Strelitzia parvifolia* Dryand, Port Alfred (Kowie), *Penther* 1610.

The type of this species has not been seen and there is no other record of a Pestalotia occurring on *Strelitzia* in South Africa; the above description has been taken from that of Hennings in the Plantae Pentheriana. He states that *Pestalotia Zahlbruckneriana* is closely related to *P. palmarum* Cooke, but is quite distinct from that species.

SPECIES EXCLUDENDA.

Pestalotia Evansii P. Henn.

P. Hennings, Engl. bot Jahrb. 41 (1908) 273. Sacc. Syll. Fung. XXII: 1222.

The type of this fungus was collected on *Syzygium cordatum* Hochst. at Barberton by Dr. Pole Evans (No. 234); it has 2-celled, brown spores with 2–4 hyaline, flexuose cilia

at the apex, and is identical with *Neobarclaya natalensis* Syd., on the same host (Durban, *Medley Wood* 6446, 374).

To Mr. E. W. Mason, of the Imperial Mycological Institute, I am indebted for comparing the type of the latter fungus with that of *Neobarclaya congesta* (Berk. & Br.) Petch, which occurs on *Eugenia Jambolana* in Ceylon. He states that there can be no doubt that they are the same. The spores are very variable, from narrow clavate to broadly oval, and show a total variation of 18–30 × 7–12 μ.

The synonymy is as follows :—

Neobarclaya congesta (Berk & Br.) Petch.

Petch, Ann. Roy. Bot. Gard. Peradeniya IX (1924) 165.

Pestalotia congesta Berk & Broome, Journ. Linn. Soc. Lond. XIV (1875), 89.

Neobarclaya natalensis Did, Hedwigia 38 (1899) p. (134).

Pestalotia Evansii P. Henn., Engl. Bot. Jahrb. 41 (1908), 273.

on *Syzygium cordatum* Hochst. (– *Eugenia cordata* Laws.) Durban, *Medley Wood* 6446, 374, 9476 ; Barberton, *Pole Evans*, 234, 1152, *Doidge*, 2009 ; Nelspruit, *Pole Evans*, 11024 ; Eshowe, *McClean*, 33092.

Grateful acknowledgements are due to Dr. E. M. Doidge, Principal Plant Pathologist, for her assistance, and to the Chief, Division of Botany and Plant Pathology for the loan of specimens from the Cryptogamic Herbarium in Pretoria.

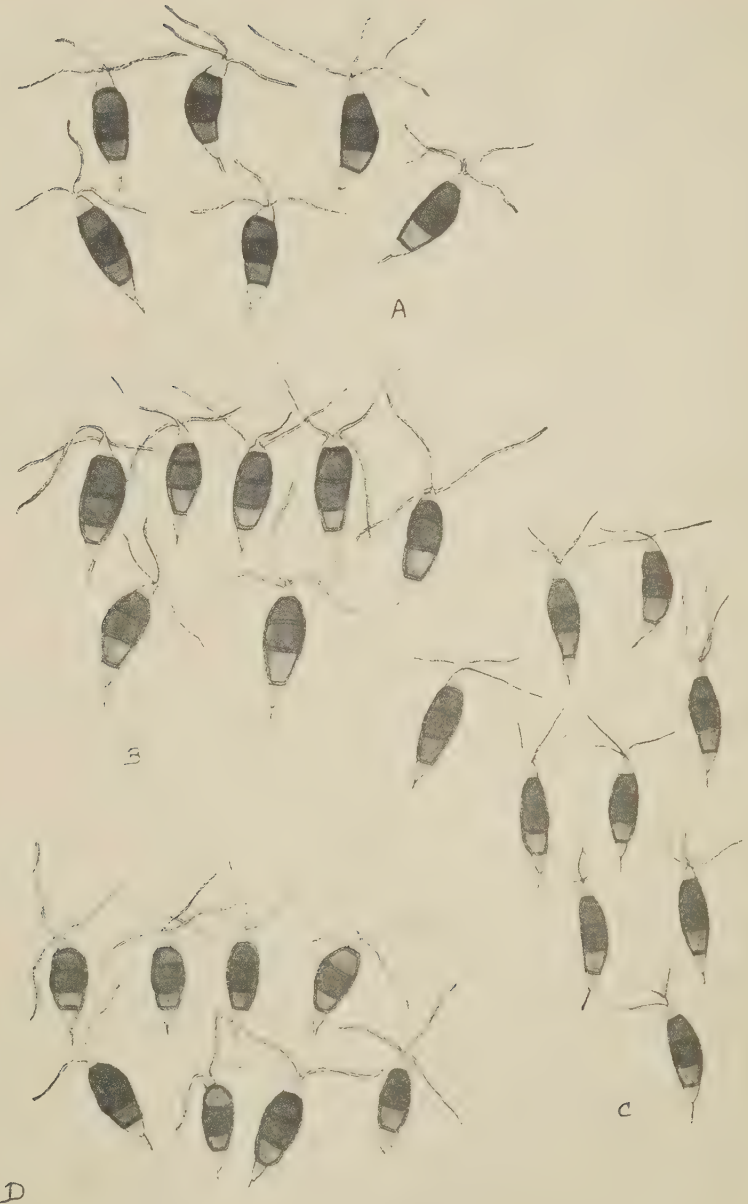


Plate I.—Conidia of: (a) *Pestalotia Burchelliae*,; (b) *P. caffra*; (c) *P. Cassinis* on *Cassine*; (d) *P. Encephalartos*.

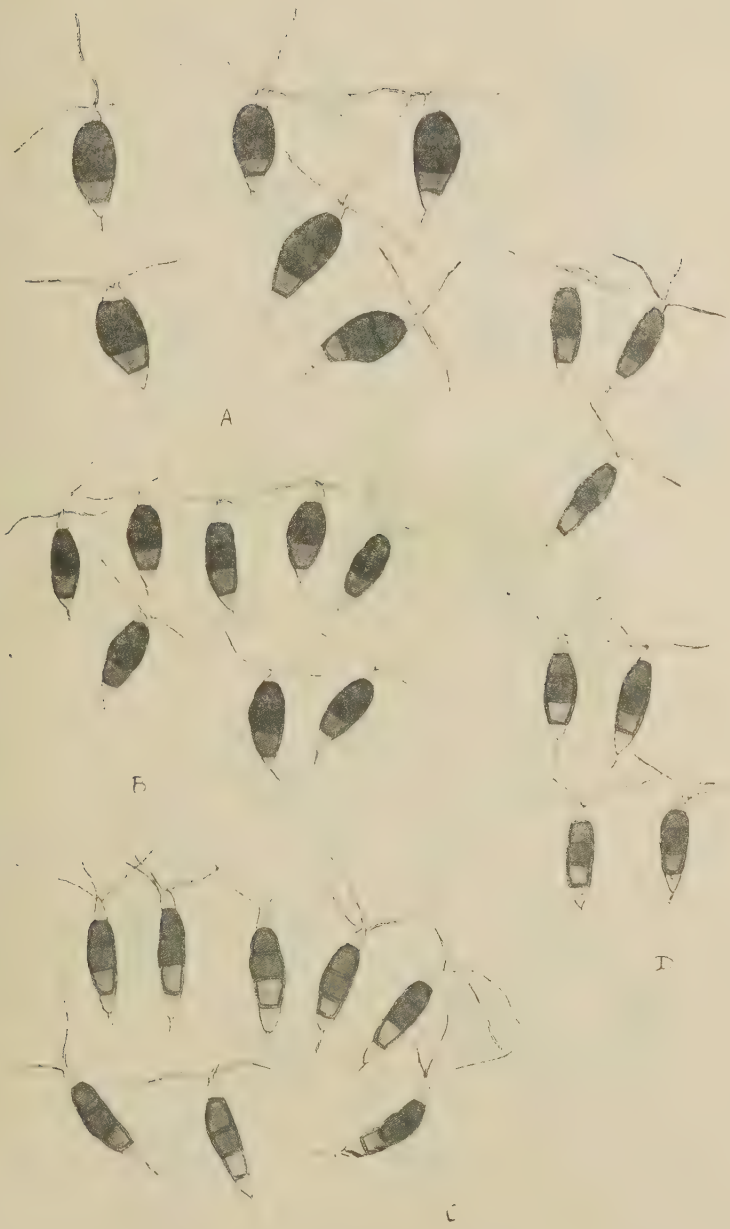


Plate II.—Conidia of: (a) *Pestalotia Laurophylli*; (b) *P. Milletiae*; (c) *P. Ocoteae*; (d) *P. Cassinis* on *Pterocelastrus*.

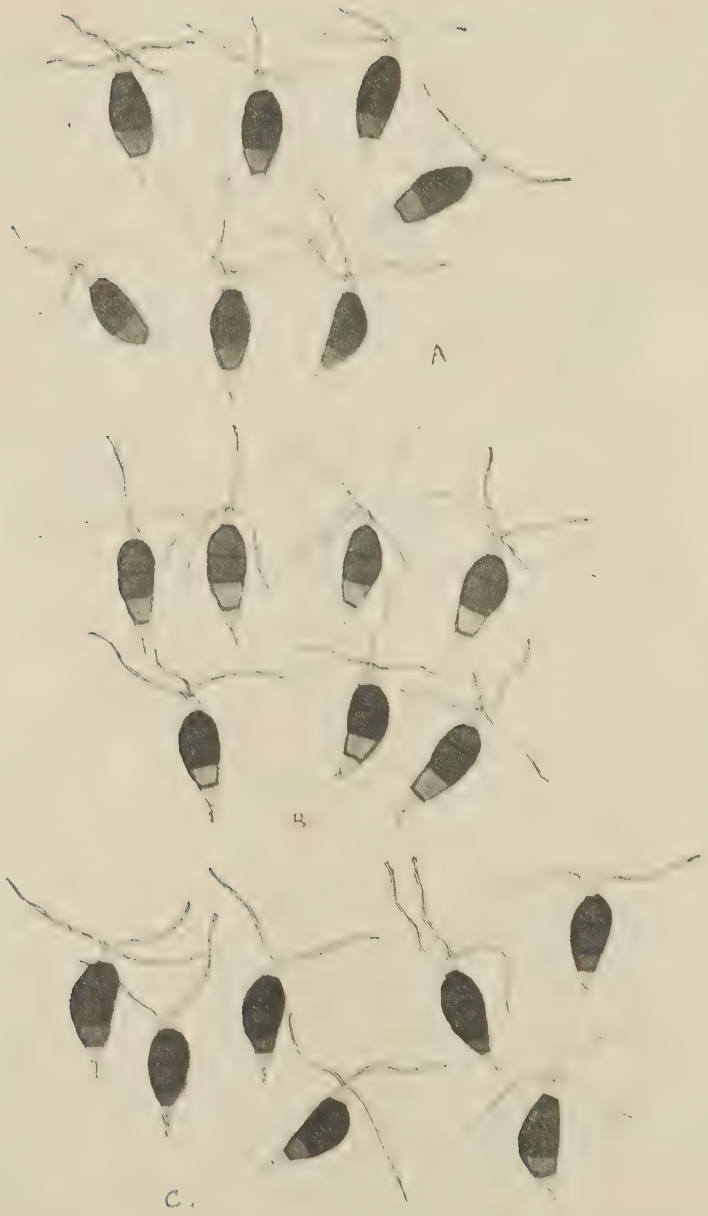


Plate III.—Conidia of: (a) *Pestalotia Pelargonii*; (b) *P. Podocarpi*: (c) *P. Rapaneae*.

A

B

Plate IV.—Conidia of: (a) *Pestalotia Trichocladi*; (b) *P. Watsoniae*.

Plate V.—Conidia of: (a) *Pestalotia Pterocelastri*; (b) *P. Laughtonae*.

SOUTH AFRICAN ASCOMYCETES IN THE NATIONAL HERBARIUM.

By Ethel M. Doidge.

Part VI.

196. **Erikssonia Carissae** Doidge nov. spec.

Perithecia hypophylla, maculis dilute brunneolis usque 10 μ diam., insidentia, laxe v. densiuscule dispersa, immersa, globosa, 75–120 μ diam. : pariete 25–40 μ crasso stromatice e stratis numerosis cellularum tenuiter tunicatarum olivaceo-brunnearum, angulatarum, 5–6 μ diam. composito, superne cum epistromate connato ; epistroma emergentia, alata, recurvata, plus minus radiatim usque 130 μ diam. producta : ostiolo 20–25 μ longo, haud vel vix prominulo, poro truncato-conico v. cylindraceo, ca. 12–16 μ lato pertuso. Asci cylindracei v. cylindraceo-clatati, 8-spori, superne late rotundati, brevissime pedicellati, 45–55 × 6–7 μ, tenuiter tunicati, ad apicem leniter incrassati. Sporae distichae, oblongo-clavatae, utrinque rotundatae, 1-septatae, hyalinae, 12·5–15 × 2–3 μ. Paraphyses filiformes, mox mucosae.

Hab. in foliis *Carissae bispinosae*, Mtunzini prope Eshowe, leg. E. M. Laughton, 33545.

Perithecia on dry, light brown leaf spots, which are circular to irregular in outline and have a raised, dark brown or black line at the margin ; hypophyllous, scattered or in small groups, occasionally confluent. Perithecia globose, 75–120 μ diam., one-half to two-thirds immersed in the leaf tissue ; perithecial wall brown, stromatic, 10–15 μ thick, composed of thin-walled, olive-brown, angular, parenchymatous cells, 5–6 μ diam. Above, the wall is continuous with the epistroma, which ruptures the epidermis and emerges to the leaf surface, growing out, to a diameter of 130 μ, into re-curved, more or less radiating strands, each composed of a number of irregular rows of cells ; the ruptured epidermis adheres closely to the sides of the epistroma. Externally the wall is connected with hyphae which penetrate into the leaf tissues ; these are 5–6 μ thick, frequently septate and often constricted at the septa. Ostiole 20–25 μ long, completely merged with the epistroma and not protruding beyond the stromatal wings ; traversed by a pore which is truncate-conical to cylindrical and about 10–16 μ diam. Asci cylindrical to cylindrical-clavate, 8-spored, broadly rounded above, not tapering or tapering slightly downwards, very briefly pedicellate, 45–55 × 6–7 μ, wall ca. 1 μ thick, slightly thickened, 2·5 μ at the apex. Spores distichous, oblong-clavate, 1-septate, hyaline, 12·5–15 × 2–3 μ, upper cell slightly shorter and broader than the lower, broadly rounded above, tapering gradually downwards. Paraphyses slender, filiform, disappearing early.

on leaves of *Carissa bispinosa* (L.) Desf., Mtunzini, near Eshowe. *E. M. Laughton*, 33545.

Under a hand lens this fungus has not a definitely stellate appearance : the strands forming the epistroma are not very long and are surrounded by the thick, ruptured epidermis, which holds them more or less erect ; they are thus recurved rather than spreading, but are distinctly radiating.

197. **Microcyclus kentaniensis** Doidge nov. spec.

Stromata caulicola, in greges plus minus elongatos usque 5 mm. longos aggregata, superficialia, atra, opaca, tuberculata, 400–750 μ lata, 200–250 μ alta, pede breve centrali,

150–200 μ crassa, innato suffulta, e cellulis 7·5–10 μ diam. contexta. Loculi immersi, usque 15 in quoque stromate, 100–125 μ lati, 110–140 μ alti, prominuli. Asci fasciculati, oblongo-clavati, recti v. curvati, stipitati, 60–75 × 10–12·5 μ. Sporae plerumque distichae, oblongae, medio septatae, haud vel vix constrictae, 20–22·5 × 3–4 μ.

Hab. in caulibus *Asparagi plumosi*, Kentani, leg. A. Pegler, 8885.

Stromata caulicolous, in irregular elliptical groups up to 5 mm. long, on yellow-brown, indeterminate spots, superficial, round to irregular in outline, 400–750 μ diam., 200–250 μ high, irregularly tuberculate, with dull dark red or black surface in which the ostioles show as pale spots; connected with the hypostroma in the cortical tissues by a short central foot, which ruptures the thick cuticle and expands to form the fertile part of the stroma. Foot 150–200 μ broad, composed of prosenchymatous rows of cells 5–6 μ broad, which gradually give place to the polygonal parenchyma of the outer layers of the stroma, with cells 7·5–10 μ diam. Loculi 6–10, or up to 15 in each stroma, fairly regularly spaced, each under a tubercular prominence of the stroma, 100–125 μ broad, 110–140 μ high, subglobose to ovate, lined with elongated stroma cells 10–13 μ long, 4–6 μ broad. Asci borne on a layer of floccose hyphae which line the inner wall of the loculus and converge at the ostiole like periphyses. Ostiole short, broadly truncate-conical. Asci fasciculate, 8-spored, oblong-clavate, straight or curved, rounded above, pedicellate, 60–75 × 10–12·5 μ, with knob-like foot 3–4 μ long, often bent or curved. Spores distichous, oblong, hyaline, 1-septate, not constricted at the septum or slightly so, 20–22·5 × 3–4 μ; cells more or less equal in length or the upper slightly shorter and broader; the lower cell cylindrical, the upper slightly dilated above the septum and tapering to the rounded apex.

on stems of *Asparagus plumosus* Bkr., Kentani, *A. Pegler*, 8885.

198. **Erysiphe Brachystegiae** Doidge nov. spec.

Mycelium amphigenum, effusum, persistens, albidum. Conidia ellipsoidea v. cylindracea, 27·5–40 × 11–15 μ. Perithecia haud numerosa, sparsa v. subgregaria, globoso-depressa, 180–260 μ diam., cellulis parietis exterioris indistinctis. Appendices 25–40 in quoque perithecio, aequatoriales, ubique hyalinae, simplices, rectae v. flexuosae, plerumque 500–750 μ longae, basim 5–6 μ latae, crasse tunicatae, sursum versus non vel leniter latiores, ad apicem simplices, rectae v. leniissime incurvatae. Asci ca. 20–25 in quoque perithecio, ovati v. subclavati, antice late rotundati, postice attenuati, 80–100 × 45–55 μ. Sporae plerumque 8, hyalinae, continuae, ellipsoideae, 25–30 × 15–17·5 μ.

Hab. in foliis *Brachystegiae Randii*, Salisbury, leg. Hopkins, 25946, 29921.

Mycelium amphigenous, effuse, white or yellowish. Conidia ellipsoid to cylindrical, 27·5–40 μ long, 11–15 μ broad. Perithecia not numerous, scattered or in small groups, 180–260 μ diam., slightly flattened-globose. Outer cells of perithecial wall small, obscure. Appendages numerous, 25–40, forming a white ring round the perithecia, equatorial, hyaline throughout, radiating, simple, straight or flexuous, mostly 500–750 μ long; thick-walled at the base and 5–6 μ broad, straight at the tip, sometimes slightly dilated, occasionally slightly incurved, not typically uncinate. Asci ca. 20–25 in each perithecium, ovate or subclavate, broadly rounded above, tapering more or less below to a short foot, 80–100 μ long, 45–55 μ broad, 8-spored. Spores usually 8, seldom fewer, ellipsoid, hyaline, continuous 25–30 μ long, 15–17·5 μ broad.

on leaves of *Brachystegia Randii* Bak. f., Salisbury, *Hopkins* 1647, 25946, 26621.

This fungus was listed by Hopkins as *Uncinula* sp. in his "Descriptive List of Plant Diseases in S. Rhodesia" (Mem. Dept. Agric. S. Rhodesia No. 2, 1939, p. 7). The appendices are occasionally slightly incurved at the tips, but none were seen which were typically uncinate. The material is unfortunately scanty.

199. **Erysiphe communis** (Wallr.) Link.

in Willd. Sp. Plant. 6 (1824) p. 105, *pro pgrte.*
Blumer, Erysiph. Mittel-europas (1933) p. 177.

as *Erysiphe Polygoni* DC. in Doidge, Trans. Roy Soc. S. Afric. 5 (1915), p. 241.

Mycelium and conidial form variable. Conidia usually single, rarely in chains, 26–40 × 15–17·5 μ. Perithecia scattered or more or less grouped, flattened-globose, 75–130 μ diam.; cells of perithecial wall irregularly angular, 10–25 μ diam. Appendages basal, hyaline or brown, usually myceloid, tortuous, 1–5 times as long as the diameter of the perithecium. Asci 3–10, 50–70 × 30–50 μ, 3–6-spored. Spores hyaline, ellipsoid, continuous, 18–25 × 10–15 μ.

on leaves of *Triumfetta Sonderii* Ficalho and Hiern., Sunnyside, Pretoria, *Doidge* 2291 and *v. d. Byl*, 8880.

200. **Erysiphe Jatrophae** Doidge nov. spec.

Mycelium amphigenum, plagulas plus minus rotundatas albidas efficiente vel totam folii paginam obtegente. Conidia ellipsoidea, 30–40 × 15–20 μ. Perithecia sparsa v. laxe gregaria, globosa, 90–105 μ diam., cellulis parietis exterioris 15–20 μ diam. Appendices breves, plerumque dimidium perithecii diametrum subaequantes, sat numerosae hyalinae, tenues, tortuosae, simplices. Asci plerumque 3, rarius 2, rarissime 4 in quoque perithecio, ovati, sessiles v. vix pedicellati, 35–57·5 × 38–45 μ. Sporae 4–6, ellipsoideae, hyalinae, continuae, 17·5–22·5 × 9–12·5 μ.
Hab. in foliis *Jatrophae Zeyheri*, Pietersburg, leg. Thomsen, 1286.

Amphigenous, forming more or less round white patches, or covering the whole leaf surface. Conidia ellipsoid, 30–40 μ long, 15–20 μ broad. Perithecia on both sides of the leaf, scattered or loosely grouped, globose, 90–105 μ diam. Cells of perithecial wall irregularly angular, 15–20 μ diam. Appendages short, length not more than half the diameter of the perithecium, fairly numerous, hyaline, delicate, tortuous and mycelium-like. Asci mostly 3, sometimes 2, very rarely 4 in each perithecium, ovate, sessile or very briefly pedicellate, 35–57·5 × 38–45 μ, 4–6 spored. Spores ellipsoid, hyaline, continuous, 17·5–22·5 μ long, 9–12·5 μ broad.

on leaves of *Jatropha Zeyheri* Sond., Pietersburg, *Thomsen*, 1286, Type.
Jatropha natalensis Müll. Arg. Ehlanzeni, *Doidge*, 8248 (Oidium only).
Jatropha Woodii O. Ktze., Ladysmith, *Pole Evans*, 2030. (Oidium only).
Acalypha angustata Sond., Garstfontein, Pretoria Distr., *Erasmus*, 1266.

Sub *Erysiphe Polygoni* DC. in Doidge, Trans. Roy. Soc. S. Afric. 5 (1915), p. 241. This species belongs to the *Erysiphe Polygoni* group and is near *Erysiphe Urticae* (Wallr.) Klotzsch.

201. **Erysiphe nitida** (Wallr.) Rabenh.

Deutschl. Krypt. Fl. 1 (1844), p. 231.
Blumer, Erysiph. Mittel Europas (1933), p. 229.
Erysiphe Polygoni DC. emend. Salmon, Mem. Torrey Bot. Club 9 (1900) p. 174, *pro parte.*

Amphigenous and caulicolous, often causing discolouration of the stem tissues under the mycelium. Mycelium well developed, more or less persistent. Conidia ellipsoid, 25–37 μ long, 14–20 μ broad. Perithecia scattered or in groups, globose or flattened globose, 75–110 μ diam.; cells of the perithecial wall distinct, polygonal, 10–25 μ diam. Appendages not very numerous, 5 to 30 to each perithecium, usually tortuous, mycelium-like, 1 to 5 times as long

as the diameter of the perithecium, only a few reaching the maximum length, septate, arising from the base of the perithecium, light brown, rather thick-walled at the base and ca. 5 μ broad, becoming paler and thinner walled upwards ; occasionally irregularly branched, especially near the tip. Asci usually 2–6 in each perithecium, seldom as many as 8 and exceptionally only 1, ovate, sessile or briefly pedicellate, 50–70 μ long, 30–45 μ broad. Spores 3–5, seldom 2, in each ascus, ellipsoid, hyaline, continuous, 18–25 × 10–15 μ.

on *Delphinium Ajacis* Linn., Johannesburg, *Sieling*, 14123 ; Arcadia, Pretoria, Bottomley, 23624 ; Imvani, Cape, *Bisset*, 26598.

Delphinium cultorum Voss, New England Rail, Cape, *Lawrence*, 25928 ; Salisbury, *Hopkins*, 25947 ; Durban, *McClean*, 24897 ; White River, *Wager*, 27694 ; Brooklyn, Pretoria, *Doidge*, 28510, 28957 ; Pietermaritzburg, *Schmutz*, 30120.

on *Knowltonia glabricarpellata* Huth, Knysna, *Bottomley*, 32261. (Oidium only).

202. **Erysiphe umbelliferarum** de Bary.

Beitr. z. Morph. u. Phys. Pilze 1 (1870) p. 50.

Blumer, Erysiph. Mittel-Europas (1933), p. 195.

Mycelium and conidia well developed, amphigenous and caulicolous. Hyphae much branched, with more or less definitely lobed haustoria. Conidia abstricted singly, rarely in short chains, small, cylindrical, 30–42 μ long, 12–18 μ broad. Perithecia much flattened, 90–115 μ diam. ; cells of perithecial wall small, often obscure. Appendages usually numerous, short, once to twice as long as the diameter of the perithecium, brown, often irregularly bent and usually once, or several times, irregularly branched. Asci 3–8, seldom up to 10 in each perithecium, ovate to subglobose, very briefly pedicellate, 55–70 × 30–45 μ, 3–5, seldom 6-spored. Spores ellipsoid, hyaline, continuous, 20–28 × 10–15 μ.

on *Trachymene caerulea* Graham, leaves and stems, Utrecht, *v. d. Spuy*, 30929.

The fungus on *Trachymene* has usually about 5 asci in each perithecium, and 4–5 spores in each ascus. The appendages are not very numerous and are rather sparingly branched ; otherwise it agrees closely with the description given by Blumer (l.c.). He mentions a wide range of hosts belonging to the *Umbelliferae*, but *Trachymene* is not included.

203. **Phyllactinia Acaciae** Syd.

Ann. Myc. 33 (1935), p. 233.

Hypophyllous ; mycelium effuse, fairly well developed, more or less persistent, formed of hyphae 3–5 μ thick. Conidia cylindrical, 45–60 μ long, obtusely rounded at both ends, often with lateral walls somewhat concave, and thus 10–12·5 μ broad at the ends, 6–9 μ broad in the centre. (According to Sydow l.c., the conidia are 50–70 × 12–16 μ, but none of those examined exceeded the measurements given above.) Perithecia scattered, not numerous, 120–210 μ diam. ; cells of perithecial wall rather obscure, ca. 10–12·5 μ diam. Appendages 6–12, hyaline throughout, rigid, simple, ca. 90–150 μ long ; bulbous base 25–35 μ diameter ; above the swollen base, appendages are 7·5–10 μ thick and thick-walled, tapering to 2·5–4 μ at the tip where the wall is thinner ; near the base the wall is ca. 2·5 μ thick and the lumen almost obliterated, but the thickness is uneven. Asci ca. 5–10 in each perithecium, ovate, briefly pedicellate, 45–60 · 20–30 μ, 2–3-spored. Spores hyaline, ellipsoid, continuous, ca. 22–30 × 12–14 μ.

on *Acacia robusta* Burch., on leaves, Klapperkop, near Pretoria, *Mogg*, 23428 (Type collection).

Unfortunately there are very few perithecia on the type collection, and these are barely mature. Fungi belonging to the *Erysiphaceae* form perithecia comparatively rarely under South African conditions, and they are seldom found on cultivated plants.

204. **Phyllactinia Combreti** Doidge nov. spec.

sub *Phyllactinia corylea* (Pers.) Karst., in Doidge, Trans. Roy. Soc. S. Africa 5 (1915), p. 242.

Mycelium hypophyllum, persistente, primitus plagulas rotundatas v. irregulares albidas efficiente, deinde effusum, magnam folii partem obtegente. Conidia oblongo-ellipsoidea, rarius subclavata, plerumque utrinque leniter attenuata, 62·5–80 × 17·5–22·5 μ. Perithecia sat numerosa, sparsa, globoso-depressa, 275–400 μ diam.; cellulis parietis exterioris obscuris. Appendices 15–20 in quoque perithecio, ubique hyalinae, 220–450 μ longae, parte basali vesiculoso-inflatae, 35–50 μ diam., supra basim bulbosum 15–20 μ latae, crasse tunicatae, sursum versus leniter attenuatae ad apicem tenuiter tunicatae, 8–10 μ latae. Asci numerosi, ca. 40–50 in quoque perithecio, oblongi v. ovati, antice late rotundati, postice breviter pedicellati, 80–95 × 27·5–37·5 μ, crasse tunicati, 2–3-spori. Sporae ellipsoideae, hyalinae, continuae, 35–40 × 17·5–25 μ.

Hab. in foliis *Combreti Zeyheri*, Pretoria, leg. Doidge, 1506.

Hypophyllous; mycelium fairly well developed, at first forming round to irregular, white or yellowish blotches, later effuse, covering a great part of the leaf surface; more or less persistent. Conidia oblong-ellipsoid, rarely subclavate, usually tapering slightly to rounded ends, 62·5–80 × 17·5–22·5 μ. Perithecia fairly numerous, scattered, flattened-globose, 275–400 μ diam.; cells of perithecial wall obscure. Appendages 15–20 to each perithecium, 220–450 μ long, hyaline throughout; bulbous base 35–50 μ diam.; above the swollen base, 15–20 μ thick and thick-walled, wall ca. 4 μ thick; rapidly becoming thin-walled above and tapering very slightly to the tip, which is delicate, easily crushed and 8–10 μ thick. Asci numerous, ca. 40–50 in each perithecium, oblong or ovate, 80–95 × 27·5–37·5 μ, contracted rather suddenly below into a foot which is straight and peg-like or is bent; foot up to 20 μ long; asci thick-walled, 2–3-spored. Spores ellipsoid, hyaline, continuous, 35–40 × 17·5–25 μ. Penicillate cells rather well developed.

on *Combretum Zeyheri* Sond., on leaves, Sunnyside, Pretoria, *Doidge*, 1506 (Type), . and *Pole Evans*, 9743; Letaba Drift, *Doidge*, 1806.

205. **Phyllactinia Erythrinae** Doidge nov. spec.

Mycelium hypophyllum, persistente, albidum, saepe densum, totam folii paginam obtegens, interdum tenue, plagulas irregulares efficiens. Conidia clavata, 62·5–87·5 × 15–22.5 μ, plerumque 75–80 × 17·5 μ, antice rotundata, postice ad basim truncatam 7–9 μ latam attenuata. Perithecia sat numerosa, subgregaria, globosa, 180–240 μ diam., cellulis parietis exterioris 10–15 μ diam. Appendices 9–15 in quoque perithecio, rectae, haud septatae, basi vesiculo-inflatae 37·5–45 μ diam., supra basim bulbosam 10–15 μ latae, crasse tunicatae, sursum sensim attenuatae ad apicem 4–5 μ latae tenuiter tunicatae. Asci immaturae.

Hab. in foliis *Erythrinae caffrae*, Greytown, leg. Doidge, 15418.

Hypophyllous. Mycelium and oidial stage often well developed, dense, completely covering the under side of the leaf; sometimes thin, arachnoid, and forming only irregular patches. Conidia clavate, 62·5–87·5 μ long, 15–22·5 μ broad in the broadest diameter, which is usually about one-third of the distance from apex to base; rounded at the apex, tapering to the truncate base, which is 7–9 μ broad; most of the conidia are 75–80 × 17·5 μ. Perithecia often numerous, closely and fairly evenly distributed in the mycelium or in small groups, but not closely crowded, globose, 180–240 μ diam.; cells of the perithecial wall rather obscure, ca. 10–15 μ diam. Appendages 9–15 to each perithecium, simple, straight, non-septate, longer than the diameter of the perithecium, 350–450 μ long; basal swelling 37·5–45 μ diam.; appendages 10–15 μ thick just above the bulbous base and thick-walled, tapering gradually and becoming thinner-walled towards the tip, which is 4–5 μ broad.

Penicillate cells numerous, well developed. Asci quite immature in all the perithecia examined.

on *Erythrina caffra* Thunb., on leaves, Greytown, *Doidge*, 15418, Type; Nelspruit, *Wager*, 23398.

Oidium only; Durban, 25895; Harden Heights, *Pole Evans*, 1394; Nelspruit, *Liebenberg*, 25991.

206. **Phyllactinia Evansii** Doidge nov. spec.

Mycelium hypophyllum, tenue, effusum, subpersistens. Conidia oblonga, antice late rotundata, basi rotundata v. truncata, 45–55 × 10–15 μ. Perithecia sparsa, globoso-depressa, 180 220 μ diam., cellulis parietis exterioris subobscuris, angulato-rotundatis, 7–10 μ diam. Appendices 10–15 in quoque perithecio, ubique hyalinae, rigidae, 150–200 μ longae, basi vesiculoso inflatae 25–35 μ diam.; supra basim bulbosam 7–10 μ latae, crasse tunicatae, ad apicem tenuiter tunicatam ca. 4 μ latam sensim attenuatae; plerumque simplices, interdum furcatae. Asci numerosae, usque 40 in quoque perithecio, ovati, raro oblongi, breviter pedicellati, 55–70 × 22–35 μ, plerumque 2– rarius 3-sporae. Sporae ellipsoideae, hyalinae, continuae, 20–35 × 10–17·5 plerumque 30–35 × 15–17·5 μ.

Hab. in foliis *Burkeae africanae*, Wonderboom, prope Pretoria, leg. Pole Evans, 9758.

Hypophyllous. Mycelium rather thin, effuse, more or less persistent. Conidia oblong, broadly rounded above, rounded or truncate at the base, 45–55 × 10–15 μ. Perithecia scattered, flattened-globose, 180–220 μ diam.; structure of the perithecial wall rather obscure, formed of rounded-angular cells 7–10 μ diam. Appendages 10–15 to each perithecium, hyaline throughout, rigid, 150 200 μ long; bulbous base 25 35 μ diam.; above the swollen base, usually simple, 7 10 μ thick, tapering upwards to about 4 μ at the rounded apex; wall up to 2·5 μ thick, or the lumen obliterated in places, wall getting gradually thinner upwards; occasionally forked just above the bulbous base, branches nearly equal, or one much shorter than the other. Asci numerous, up to 40 in each perithecium, ovoid, rarely oblong, briefly pedicellate, 55 70 × 22 35 μ, 2-spored, rarely 3-spored. Spores ellipsoid, hyaline, continuous, 30-35 × 10–17·5 μ, mostly 30–35 × 15–17·5 μ, the smaller spores in the 3-spored asci.

on *Burkea africana* Hook., on leaves, Wonderboom, Pretoria district, *Pole Evans*, 9758.

Phyllactinia rhoina Doidge nov. spec.

Mycelium hypophyllum, tenuissimum, effusum. Perithecia sparsa, globoso-depressa, 180-220 μ diam., cellulis parietis exterioris obscuris. Appendices 6 9 in quoque perithecio, 200 300 μ longae, basi vesiculoso-inflatae, 45 50 μ diam., supra basim bulbosam 10 11 μ latae, crasse tunicatae, sursum versus leniter attenuatae ad apicem fragilem ca. 6 μ latam. Asci numerosi ca. 20 30 in quoque perithecio, ovati v. oblongi, apice late rotundati, infra pedicellati, 2-spori rarius 3-spori. Sporae vix maturae, hyalinae, continuae, ellipsoideae, 30 37·5 × 17·5–21 μ.

Hab. in foliis *Rhois pyroides* var. *transvaalensis*, Garstfontein prope Pretoria, leg. Pienaar, 6662.

Hypophyllous. Mycelium not conspicuous, conidia not seen. Perithecia scattered, flattened-globose, 180 220 μ diam.; cells of the perithecial wall obscure. Appendages 6 9 to each perithecium, 200 300 μ long or possibly longer, as the apices of those examined were usually broken; basal swelling 45–50 μ diam.; above the bulbous base 10 11 μ thick, with wall 2·5 μ thick becoming thinner-walled above and tapering very slightly to an apex 6 μ broad. Asci numerous, ca. 20 30 in each perithecium, ovate or oblong, broadly rounded above, 60 75 × 25 32·5 μ, contracted suddenly below into a stalk which is straight or bent

and 10–25 μ long; asci 2-spored, rarely 3-spored. Spores barely mature, hyaline, ellipsoid, continuous, 30–37·5 × 17·5–21 μ. Penicillate cells fairly well developed.

on *Rhus pyroides* Burch, var. *transvaalensis* Schon., on leaves, Garstfontein, Pretoria district, *Pienaar*, 6662, Type and 1533; Brits, *Moore*, 23235.

Rhus discolour E. Mey., Grootfontein, nr. Harrismith, *v. d. Byl*, 2317.

208. **Phyllactinia Sphenostylidis** Doidge nov. spec.

Mycelium hypophyllum, persistens, albidum, effusum. Conidia clavata, apice rotundata, infra attenuata ad basim truncatam, 57·5–80 × 20–25 μ, plerumque 50–52·5 × 20–22·5 μ. Perithecia sparsa, globoso-depressa, 180–230 μ diam., cellulis parietis exterioris 10–15 μ latis. Appendices 5–9 in quoque perithecio, simplices, ubique hyalinae, rigidae, 175–235 μ longae, basi vesiculoso-inflatae, 35–45 μ diam.; supra basim bulbosam 10–12·5 μ latae, ad apicem 4 μ latam sensim attenuatae. Asci immaturae.

Hab. in foliis *Sphenostylidis angustifliae*, Groenkloof, prope Pretoria, leg. Bottomley, 17024.

Hypophyllous. Mycelium and conidial stage usually well developed, forming dense, dirty white or yellowish patches, or covering the whole of the under surface of the leaf. Conidia clavate, rounded above, 50–80 μ long, 20–25 μ broad at the broadest diameter, which is about one-third of the distance from apex to base, tapering downwards to the truncate base, which is 7·5–10 μ broad: the majority of the conidia are 50–52·5 × 20–22·5 μ. Perithecia scattered, 180–230 μ diam.; cells of the perithecial wall obscure, 10–15 μ diam. Appendages 5–9 on each perithecium, simple, hyaline throughout, rigid, 175–235 μ long; swollen base 35–45 μ diam.; above the basal swelling, appendages are 10–12·5 μ thick with wall ca. 1·5 μ thick, tapering gradually upwards and becoming thinner-walled towards the tip, which is ca. 4 μ thick. Asci quite immature in numerous perithecia examined. Penicillate cells numerous, well developed.

on *Sphenostylis angustifolia* Sond., on leaves, Groenkloof, Pretoria, *Bottomley*, 17024 Type; Sunnyside, Pretoria, *Pole Evans*, 1413, 1510, 6693; Garstfontein, Pretoria district, *Pienaar*, 2252; Waterkloof, *Wager*, 23357; Donkerpoort, *Doidge* and *Bottomley*, 29730.

This fungus occurs commonly in the neighbourhood of Pretoria; abundant material has been collected and examined from late summer to early spring, but no mature asci have been found.

209. **Uncinula aspera** Doidge.

Trans. Roy. Soc. S. Africa 5 (1915), p. 240.

Epiphyllous. Mycelium thin, arachnoid, whitish, effuse, evanescent or sub-persistent. Perithecia scattered or gregarious, flattened-globose, 90–105 μ diam., with wall composed of rather distinct, irregularly angular cells, 12–17·5 μ diam. Appendages equatorial, 15–30 to each perithecium, straight or more or less flexuous, hyaline, simple, aseptate, equal in length to the diameter of the perithecium or exceeding it, 125–165 μ long; 5–6 μ thick at the base, becoming gradually broader upward to a thickness of 9 μ below the tip, then tapering to the apex: tips closely uncinate or somewhat spiral: wall ca. 1·5 μ thick near the base, becoming gradually thinner upwards, ca. 0·5 μ thick at the apex, roughened externally, especially in the lower half, with small, scattered, irregular protuberances. Asci 4–6 in each perithecium, ovate or subglobose, sessile or very briefly pedicellate, 51–57 × 45–48 μ, 4–6-spored. Spores oblong, hyaline, continuous, 18–21 × 13–14 μ.

on *Ficus Petersii* Warb., on leaves, Wonderboom, *Burtt Davy*, 1838.

210. **Uncinula combreticola** Doidge nov. spec.

Mycelium amphigenum plerumque epiphyllum, persistens, effusum. Conidia oblonga, utrinque truncata v. sub-rotundata, 30-37·5 × 14–15 μ. Perithecia dense congesta v. discreta, globoso-depressa, 100-140 μ diam., plerumque ca. 125 μ diam; cellulis parietis exterioris polygonalibus, 10–12 μ latis. Appendices equatoriales, numerosae, 50–75 in quoque perithecio, 90-140 μ longae, perithecii diametrum subaequantes, hyalinae, simplices, tenue tunicatae, basi 4-5 μ crassae, sursum leniter dilatatae usque 7·5-9 μ, rarius 10 μ, apice laxe uncinatae v. helicoideae. Asci 5–8 in quoque perithecio, immaturi.

Hab. in foliis *Combreti Zeyheri*, Nelspruit, leg. Doidge, 22377.

Mycelium amphigenous, but mostly epiphyllous, at first forming rather poorly defined irregularly circular, scattered spots, on the upper side becoming confluent and covering the greater part of the leaf surface. Mycelium dirty white or yellowish, dense, persistent. Conidia oblong, truncate or somewhat rounded at both ends, 30-37·5 × 14–15 μ. Perithecia closely crowded in small or large patches, less frequently scattered, globose, flattened, 100-140 μ diam., mostly ca. 125 μ; perithecial wall composed of polygonal cells 10-12 μ broad. Appendages equatorial, 50-75 in number, on an average equalling in length the diameter of the perithecium, 90-140 μ long, hyaline, simple, thin-walled throughout, smooth, occasionally slightly rough in places, not septate; 4-5 μ thick at the base, broadening upwards to 7·5-9 μ, rarely 10 μ, just below the tip and then tapering slightly to the apex; tips loosely uncinate or loosely spiral. Immature appendages are often distended abruptly below the tip, which is often hastate and straight, later becoming uncinate. Asci 5–8 in each perithecium, immature.

on *Combretum Zeyheri* Sond., on leaves, Nelspruit, *Doidge*, 22377, Type; Ledzee, *Doidge*, 1793.

211. **Uncinula Eylesii** Doidge nov. spec.

Mycelium amphigenum et petiolicolum, persistens, effusum. Conidia ellipsoidea, 14–30 × 10–14 μ, plerumque 20–22·5 × 10 μ. Perithecia sparsa v. subgregaria, globoso-depressa, 90-105 μ diam., cellulis pariete exterioris polygonalibus, 10-15 μ latis. Appendices 24-26 in quoque perithecio, 80-125 μ longae, perithecii diametrum subaequantes, simplices, leves, basi brunnea 5–6 μ latae ad apicem hyalinem 3–4 μ crassam sensim attenuatae; apice primitus rectae deinde laxe uncinatae. Asci 5–7 in quoque perithecio, ovati, breviter pedicellati, 35–42·5 × 20–22 μ (immaturi).

Hab. in foliis *Acalyphae ciliatae*, Salisbury, leg. Eyles, 13992.

Mycelium amphigenous and petiolicolous, rather densely arachnoid, persistent, at first forming more or less round, poorly defined spots and finally covering the greater part of the leaf surface. Conidia ellipsoid, 14–30 × 10–14 μ, mostly 20–22·5 × 10 μ. Perithecia scattered or rather loosely grouped, often near the veins of the leaf, flattened-globose, 90–105 μ diam. Appendages 24–36 on each perithecium, usually equalling in length the diameter of the perithecium or somewhat longer, rarely shorter, 80-125 μ long; 5-6 μ thick at the base, which is golden brown, becoming gradually paler upwards and tapering slightly to the hyaline, rounded apex, which is 3-4 μ thick; tips at first straight, then very loosely uncinate, forming one complete turn or a half turn, 12·5-15 μ across; simple, smooth, non-septate, wall ca. 1 μ thick throughout or slightly thicker at the base. Asci 5–7 in each perithecium, ovate, briefly pedicellate, 35–42·5 × 20–22 μ, immature.

on leaves of *Acalypha ciliata* Forsk., on leaves, Salisbury, *Eyles* 2071, 13992.

212. **Uncinula incrassata** Salm.

Ann. Myc. 6 (1908), p. 524.

Sacc. Syll. Fung. XXII: 22; Gepp, Journ. Linn. Soc. Bot., 40 (1911), p. 242.

Uncinula Pterocarpi Doidge, Trans. Roy. Soc. S. Africa 5 (1915) p. 240, Pl. II.

Amphigenous ; mycelium densely arachnoid, dirty white or yellowish, often covering the greater part of the leaf surface, persistent. Conidia not seen. Perithecia very numerous, in small or large groups, or more or less scattered, at first yellow, sub-globose, then chestnut colour, flattened-globose, 100–140 μ diam. Perithecial wall composed of polygonal cell 10–12 μ diam. Appendages 60–120 to each perithecium, thickly set over the whole upper half of the perithecium, varying in length, 50–150 μ long., i.e., some exceeding the diameter of the perithecium, some only half of its diameter and others intermediate in length ; the longer appendages are borne round the central zone of the perithecium and the shorter near its apex. Appendages not septate, 4–7 μ thick, mostly 5–6 μ, rather irregularly thick-walled throughout ; even before the perithecium is mature becoming thick-walled right up to the apex ; apex usually simply and closely uncinate, rarely sub-helicoid. Asci 8–12 (3–7 fide Salmon in immature perithecia) ovate, 45–50 × 20–28 μ, briefly pedicellate, often curved, 4–spored. Spores ellipsoid, hyaline, 13–18 × 12–13 μ.

on *Pterocarpus rotundifolius* (Sond.) Druce (= *Pt. sericeus* Benth.), Duivelskloof, northern Transvaal, *Doidge*, 1805.

Although the type of *Uncinula incrassata* has not been available for comparison, there seems to be no doubt, after a more careful study, that *U. Pterocarpi* Doidge is identical with that species ; the original specimen was immature. It was said to be on *Pt. melliferus* Welw., collected on the Zona River, Jihu, Gazaland, by Swynnerton, but it seems probable that the host was wrongly named. *Pt. melliferus* occurs in Angola, and is not included in the list of flowering plants collected in Gazaland by Swynnerton. *Pt. rotundifolius* is a closely related species, and it occurs in Gazaland.

213. **Uncinula polychaeta** (Berk and Curt.) ex Ellis.

Ellis, Journ. Myc. 2 (1886), p. 43.

Salmon, Mem. Torr. Bot. Club 9 (1900), p. 113. Doidge, Trans. Roy. Soc. S. Afric. 5 (1915), p. 240. (For synonymy and further references see Salmon l.c.).

Hypophyllous ; mycelium dense, in irregular, whitish patches, which are often numerous and cover the greater part of the leaf surface, persistent or completely evanescent. Conidiophores slender, hyaline, 4–5-celled, 120–240 μ long, 6–7·5 μ thick at the base, tapering somewhat to 5–6 μ at the apex. Conidia clavate or narrow ovate, hyaline, straight or occasionally curved, rounded above, tapering to the truncate base which is 5 μ broad, 35–75 μ long, mostly 50–55 μ long, 14–17·5 μ broad in the broadest diameter, which is usually about one-third of the length from apex to base. Perithecia more or less closely gregarious on the patches of mycelium, or scattered, 220–400 μ diam. ; cells of the perithecial wall rather obscure, polygonal, 6–10 μ diam. Appendages very numerous, usually about 200, closely crowded and 50–200 μ long, in length about one-fourth to two-thirds of the diameter of the perithecium, 4–6 μ thick at the base, hyaline, smooth, simple, aseptate, tapering slightly upwards to the tip, which is 3·5–4 μ thick and closely uncinate ; thick-walled, with the lumen more or less completely obliterated. Asci very numerous, 34–66 in each perithecium, cylindrical to oblong, broadly rounded above, 75–95 × 20–30 μ, narrowed rather abruptly below into a stalk 5–20 μ (mostly 5–10 μ) long, which may be straight, but is usually bent near the base, 3–4-spored. Spores ellipsoid, hyaline, continuous, 25–30 × 12–15 μ.

on *Celtis Kraussiana* Benth., on leaves, Fountains Valley, near Pretoria, *van der Byl*, 2096, 2202, *Pole Evans*, 2336, 2361, *Bottomley*, 34418 ; Garstfontein, Pretoria district, *Pienaar*, 1260 ; Zoutpansberg, *Burtt Davy*, 181.

This seems to be a variable species ; the collection from the northern Transvaal (No. 181) has perithecia 220–320 μ diam., agreeing with the measurements given by Salmon (loc. sit). ; in specimens from the Fountains Valley, the perithecia are almost all 300–400 μ diam. The number of spores in the ascus also varies ; in the American examples studied by Salmon,

the asci are almost always 2-spored, with rarely a rudimentary third spore present; a Chinese specimen differed in having asci which are regularly 3-spored: in South African material examined, the asci are 3- or 4-spored in almost equal numbers.

The conidia are most abundant in material collected during February, March and April; leaves showing perithecia in all stages of development were collected in May and June.

214. **Meliola Atalayae** Doidge nov. spec.

Plagulae plerumque epiphyllae, atrae, sparsae, plus minus rotundatae, usque 3–5 mm. diam. Mycelium reticulatum, ex hyphis brunneis, opposite ramosis, plerumque undulatis rarius rectiusculis, 7–9 μ crassis compositum. Hyphopodia capitata, sat numerosa, plerumque alternantia, rarissime opposita, 14–17·5 μ longa; cellula inferiore breve cylindracea, 4–5 μ longa, 7·5–9 μ lata; superiore ovata v. cylindracea, plerumque late rotundata rarius truncata v. subangulata, rarissime sublobata, 10–12 μ longa, 10–11 μ lata. Hyphopodia

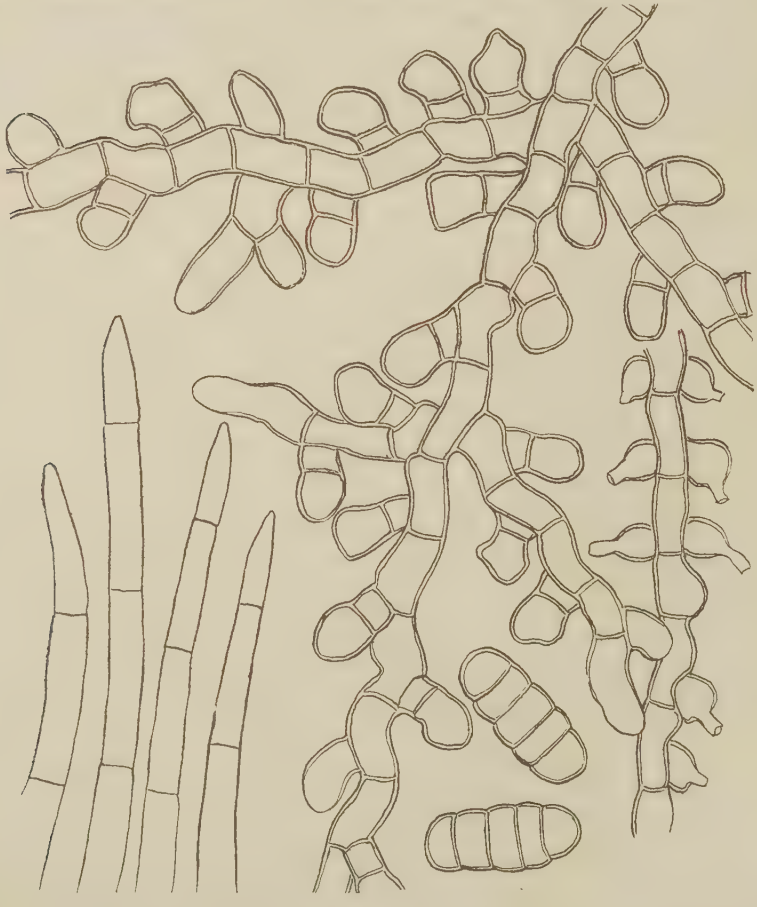


Fig. 1.—*Meliola Atalayae*, mycelium with capitate and mucronate hyphopodia; tips of mycelial setae spores.

mucronata modice numerosa, alternantia, unilateralia v. opposita, haud pallidiore, ampullacea, 12·5–17·5 μ longa, basi 6–9 μ lata, subito in collum obliquum, curvatum v. interdum rectum, 2·5–6 μ longum, 2·5–4 μ crassum attenuata. Setae myceliales haud numerosae, praecipue juxta perithecia evolutae, simplices, rectae v. plus minus curvatae, ubique pellucidae, septatae, 180–240 μ longae, inferne 7–7·5 μ crassae, obscure brunneae, apicem versus pallidiores, haud vel vix attenuatae, acutae, rarissime obtusae v. rotundatae. Perithecia globosa, atra, verrucosa, 140–175 μ diam. Asci 2-spori. Sporae brunneae, 4-septatae, cylindraceae, utrinque rotundatae, leniter constrictae, 30–35 × 11–14 μ.

Hab. in foliis *Atalayae natalensis*, in sylvis Ngomi, leg. Joubert, 33912.

Colonies predominantly epiphyllous, hypophyllous colonies rare, scattered, dull black, more or less round, up to 3·5 mm. diam.

Mycelium more or less closely reticulate. Hyphae rather thin-walled, snuff-brown shading to deep olive-buff at the tips, 7–9 μ thick, usually more or less undulating, with short cells 11–15 μ long: there are some hyphae almost straight, with few hyphopodia and cells up to 35 μ long: branching usually opposite, with branches emerging almost at right angles to the main hyphae. Capitate hyphopodia rather numerous, usually one to each cell of the hypha, mostly alternate, rarely opposite, making a wide angle with the hypha, 14–17·5 μ long: basal cell short, cylindrical, 4–5 μ long and 7·5–9 μ broad: head cell ovate or cylindrical, usually broadly rounded, less frequently truncate or somewhat angular, very rarely sub-lobed, 10–12·5 μ long, 10–11 μ broad. Mucronate hyphopodia usually on separate hyphae, but occasionally intermingled with the capitate hyphopodia, alternate, unilateral or opposite, not paler than the hyphae, ampulliform, 12·5–17·5 μ long: sub-globose to oval at the base, which is 6–9 μ diam., constricted suddenly above into a neck 2·5–6 μ long and 2·5–4 μ thick, oblique, curved or occasionally straight. Mycelial setae not numerous, mostly in the neighbourhood of the perithecia, simple, abruptly geniculate at the base and almost straight, or somewhat sinuous, occasionally subfalcate, translucent throughout or sub-opaque near the dark brown base, paler towards the apex: usually 4-septate, the transverse walls being conspicuous: 180–240 μ long, 7–7·5 μ thick at the base, not tapering or tapering very slightly to the apex, which is 5–7·5 μ thick: apex acute, rarely obtuse or rounded.

Perithecia first formed near the centre of the colony, later scattered, globose, black, carbonaceous, 140–175 μ diam., surface cells convex to conical. Asci 2-spored, evanescent. Spores cylindrical, 4-septate, slightly constricted at the septa, broadly rounded at both ends, olive-brown, 30–35 × 11–14 μ.

on leaves of *Atalaya natalensis* R. A. Dyer, Ngomi Forest, *Joubert*, 33912.

215. **Meliola campylotricha** Syd.

Ann. Myc. 22 (1924) p. 420.

on *Cassinopsis tinifolia* Harv., Eshowe, *E. M. Laughton*, 33511.

This is a new host record. *Meliola campylotricha* was originally described on *Apodytes dimidiata* E. Mey., collected in the Woodbush by van der Byl (*v. d. Byl* 1515).

216. **Meliola capnodioides** Thuem.

von Thuemen in Flora 1876, p. 568.

in *Plectranthi ciliati* E. Mey., foliis vivis in sylvis prope Grahamstown, Promont. bonae spei, Julio 1876. Leg. P. MacOwen, No. 1259.

The portion of the type collection, *MacOwan* 1259, to be found in the Cryptogamic Herbarium in Pretoria is parasitised, but it is identical with a number of more recent collections on Plectranthus and other Labiates, some of which are in excellent condition. It is obvious that *Meliola capnodioides* Thuem. is the correct name for the Meliola found on plants belonging to the Labiatae in South Africa.

For various reasons this specific name has been rejected or overlooked. In 1882, Kalchbrenner (Grev. X : 147) published the following note :—

" *Meliola amphitricha* Fr.

In fol. Justiciae anagalloides Nees, Natal, Wood Nos. 241, 22, 57.

In Plectranthi ciliati et Hypsobromo elato ad Somerset East et Grahamstown, leg. MacOwan, Nos. 1259, 1292, 1328."

Several different fungi are quoted by Kalchbrenner under the name *Meliola amphitricha* : MacOwan No. 1259 is *M. capnodioides* Thuem., No. 1328 is *M. capensis* (Kalchbr. and Cooke) Theiss., and No. 1292 is *MacOwaniella congesta* (Wint.) Doidge on *Carissa bispinosa* : in the case of collection 1292, it is possible that *M. carissae* was also present on some of the leaves.

Gaillard [Le Genre Meliola (1892) p. 77] states that according to Cooke *M. capnodioides* Thuem. belongs to *M. amphitricha* and Stevens [Ann. Myc. 26 (1928) p. 289] quotes *M. capnodioides* as a synonym for *M. amphitricha* Fr., a specific name which, as Arnaud has shown [Les Asterinées (1918) p. 228] must be rejected. Stevens includes a South African fungus on Plectranthus (No. 11576) under *Meliola Psychotriae* Earle, which was originally described on Psychotria (Rubiaceae) from Porto Rico ; he also includes in this species a number of fungi on Acanthaceae.

In the account of the South African species of the Meliolineae [Doidge and Sydow, Bothalia 2 (1928) p. 459], *MacOwan* 1259 was listed under *M. Psychotriae* Earle, with the comment that the specimen is labelled *M. capnodioides* and is included by Gaillard under *M. amphitricha* Fr. The original description of *M. capnodioides* was not seen until MacOwan's " Opuscula Botanica " were acquired, in which were included reprints from Flora of von Thuemen's papers on Fungi austro-africani.

M. Psychotriae Earle [Bull. N. York Bot. Gard. 3 (1905) 308] is a very similar species, and a critical study of the Meliolas of this group (Group 9, Stevens l.c., p. 233) occurring on Rubiaceae, Acanthaceae and Labiatae is desirable. In view of the habitual narrow host limitation of the species of Meliola, it is hardly likely that a single species will cover a range of hosts including genera of all three families. Should this prove to be the case, the name *M. capnodioides* Thuem. has priority. In the meantime, the South African collections must be classified as follows :—

Meliola capnodioides Thuem.

von Thuemen, Flora 1876, p. 568 ; Sacc. Syll. Fung. I : 61.

sub *Meliola amphitricha* Fr., Kalchbrenner, Grev. X (1882) 147 ; Gaillard Le Genre Meliola (1892) 77 ; Stevens, Ann. Myc. 26 (1928) 289.

sub *Meliola microspora* Pat. and Gaill. var. *africana* Doidge, Trans. Roy. Soc. S. Afric. V (1917), 732.

sub *Meliola microspora* Pat and Gaill., Nel. Ann. Univ. Stell. (1942) 20.

on Labiatae :

Plectranthus ciliatus E. Mey., Grahamstown, *MacOwan* 1259, 20799 ; Inanda, *Medley Wood* 604, 10350, Kew ; Umzinto Bush, *Wager*, 32697.

Plectranthus sp., Buccleuch, *Doidge*, 11576 ; Inanda, *Medley Wood*, 10353 ; Woodbush, *Doidge*, 1766.

Stachys aethiopica Linn., Xumeni Forest, *Morgan* and *Doidge*, 29895.

Stachys sp., Kat River Valley, *Moore*, 21027 ; Xumeni Forest, *Doidge*, 33110.

Labiatae undet., Woodbush, *Doidge* 17768.

The collections on Acanthaceae previously included (Doidge and Sydow, l.c.) under *M. Psychotriae* Earle are not this species, and are being dealt with by Mr. C. G. Hansford in one of the papers in his series on Tropical Fungi.

217. **Meliola Hippocrateae** Doidge nov. spec.

Plagulae epiphyllae tenues, effusae. Mycelium reticulatum, ex hyphis brunneis, opposite ramosis, rectiusculis v. leniter undulatis, 6–7 μ, raro usque 9 μ crassis compositum, Hyphopodia capitata sat numerosa, plerumque alternantia v. unilateralia, raro opposita, plerumque paullo antrorsum directa, cellula basali breviter cylindracea, 2·5–6 μ longa et 5–7·5 μ lata, apicali ovata v. cylindracea, 11–14 μ longa et 8–10 μ lata. Hyphopodia mucronata opposita v. unilateralia, ampullacea, plus minus curvata v. gibbosa, raro rectiuscula, 15–25 μ longa, e basi 5–7·5 μ lata subito in collum 7·5–15 μ longum et ca. 2·5 μ latum, rectum obliquum v. curvatum attenuata. Setae myceliales modice numerosa, praecipue juxta perithecia evolutae, 250–400 μ longae, ad basim 6–7·5 μ latae, atrobrunneae subopacae, sursum sensim attenuatae ad apicem pellucidem vario modo denticulatae v. breviter furcatae dentibus plerumque 2–3, 5–7·5 μ longis v. bifurcatae ramulis usque 12·5 μ longis interdum denticulatis, vel irregulariter denticulatae v. incisae. Perithecia haud numerosa, globosa, atra, verrucosa, 150–170 μ diam. Asci non visi. Sporae oblongae, utrinque rotundatae, 4-septatae, plus minus constrictae, 37·5–45 × 13–15 μ.

Hab. in foliis *Hippocrateae Schlechteri*, Karkloof prope Maritzburg, leg. Doidge, 14971.

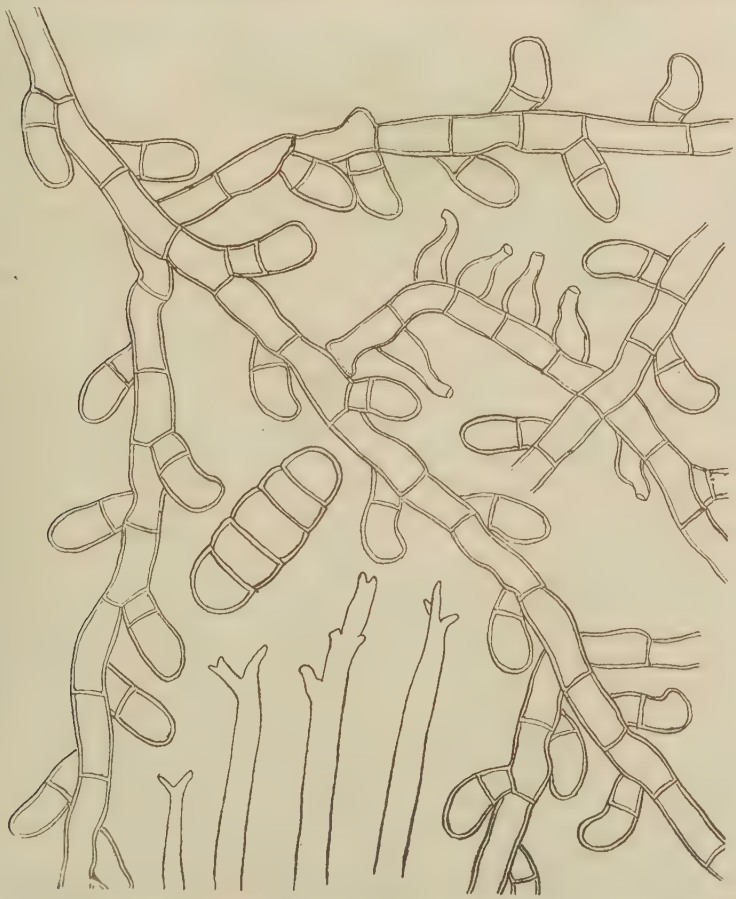


Fig. 2.—*Meliola Hippocrateae*, mycelium with capitate and mucronate hyphopodia; tips of mycelia setae; spores.

Colonies epiphyllous, thin, effuse. Mycelium reticulate; hyphae dark olive-buff to snuff-brown, straight to undulating slightly, 6–7·5 μ or occasionally up to 9 μ thick; cells 17·5–25 μ long; branching usually opposite. Capitate hyphopodia fairly numerous, mostly alternate or unilateral; often alternate, with one hyphopodium to each cell of the hypha, occasionally opposite, 14–20 μ long, usually inclined towards the hypha; stipe cell cylindrical, 2·5–6 μ long, 5–7·5 μ broad; head cell ovate or occasionally cylindrical, 11–14 × 8–10 μ. Mucronate hyphopodia interspersed with the capitate hyphopodia or on separate short branches, opposite or unilateral, or opposite a capitate hyphopodium, ampulliform, more or less curved or gibbous, rarely almost straight, not paler than the hyphae, 15–25 μ long, 5–7·5 μ broad at the base, constricted suddenly into a neck which is 7·5–15 μ long and 2·5 μ thick. Mycelial setae not very numerous, more or less grouped in the neighbourhood of the perithecia, 250–400 μ long, translucent, snuff-brown at the tips, darker, sub-opaque and 6–7·5 μ thick at the base, tapering gradually upwards; tips simple, acute, or 2–3-dentate or bifurcate; teeth minute or 5–7·5 μ long, more or less symmetrical, or bifurcate, with branches up to 12·5 μ long, one branch sometimes bidentate; or asymmetrically dentate or notched.

Perithecia not numerous, black, globose, carbonaceous, 150–170 μ diam., cells of the perithecial wall slightly convex. Asci not seen. Spores 4-septate, oblong, broadly rounded at both ends, constricted at the septa, 37·5–45 × 13–15 μ.

on leaves of *Hippocratea Schlechteri* Loes., Karkloof, nr. Maritzburg, *Doidge*, 14971.

218. **Meliola Knysnae** Doidge nov. spec.

Plagulae amphigenae, atrae, sparsae, plus minus rotundatae, usque 2·5 mm. diam., vel numerosae et confluendo majores. Mycelium reticulatum, ex hyphis copiose ramosis, brunneis, plus minus undulatis, 7·5–9 μ crassis compositum. Hyphopodia capitata alternantia, raro unilateralia, recta v. curvata, 25–37·5 μ longa; cellula basali subcylindracea, 6–12·5 μ longa, basi 5–6 μ, ad septum 6–8 μ lata; apicali quoad formam variabili, 15–20 μ lata, plerumque 2–5-lobata. Hyphopodia mucronata pauca, pallidiora, 20–27·5 μ longa, e basi 7·5–8 μ crassa sensim in collo breve attenuata. Setae myceliales sat numerosae, sparsae, atrae, opacae, simplices, rectae v. plus minus flexuosae v. falcatae, plerumque 400–500 μ longae, inferne 5–9 μ crassae, sursum leniter attenuatae ad apicem obtusum 2·5–4 μ latam; apicem versus saepe leniter dilutiores et interdum plus minus torulosae. Perithecia (vix matura) sparsa, atra, globosa, verrucosa, 120–150 μ diam. Asci non visi. Sporae 3-septatae, oblongae, utrinque leniter attenuatae, plus minus constrictae, 50–58 × 17·5–22·5 μ.

Hab. in foliis *Ilicis mitis* in sylvis Knysna, leg. Doidge, 17210 a.

Colonies amphigenous, dull black, scattered, more or less circular, up to 2·5 mm. diam., or numerous, becoming confluent and forming larger, irregular blotches. Mycelium reticulate, forming a more or less close network. Hyphae at first pale, fuscous, soon becoming buffy-brown, and older hyphae olive-brown, 7·5–9 μ thick, more or less undulating, cells 17·5–22·5 μ long, hyphae branching rather freely, branches alternate or irregular, usually emerging at an acute angle and tapering slightly at the junction with the main hyphae. Capitate hyphopodia alternate, rarely unilateral, one to each cell of the hypha, or more remote and one to every second cell, straight, curved or abruptly bent, 25–37·5 μ long; basal cell sub-cylindrical, often tapering somewhat to the base, 6–12·5 μ long, 6–8 μ thick at the septum, 5–6 μ thick at the base, rarely gibbous; apical cell very variable in form, 15–20 μ broad, 2–5-lobed; lobes shallow, rounded or truncate, with sinus usually rounded, often broadly so. Mucronate hyphopodia rare, interspersed with the capitate hyphopodia, slightly paler than the hyphae, narrow conical to sub-ampulliform with a short neck, 21–27·5 × 7·5–8 μ. Mycelial setae fairly numerous, scattered, black, opaque except near the apex, simple, straight, abruptly bent almost at right angles or more or less flexuous or falcate, mostly 400–500 μ long, 7·5–9 μ thick at the base, tapering gradually to a blunt tip 2·5–4 μ thick; sometimes slightly torulose near the apex through nodal swellings near the septa.

Fig. 4.—*Meliola Knysnae*, mycelium with capitate and mucronate hyphopodia; tips of mycelial setae spores.

Perithecia (not mature) scattered, black, globose, 120–150 μ diam.; outer wall composed of convex cells. The perithecia would probably be larger when mature. Asci not seen. Spore 3-septate, ellipsoid-oblong, tapering somewhat to broadly rounded ends, slightly constricted at the septa, 50–58 × 17·5–22·5 μ.

on leaves of *Ilex mitis* (L.) Radlk., Deepwalls, Knysna, *Doidge*, 17210 a.

Hennings (Engl. Bot. Jahrb. 17, 1893, p. 523) has described a Meliola on Ilex from Brazil. It has 3-septate spores, 50–65 × 18–21 μ, approximating in size those of *M. Knysnae*, and has hyphae 10–14 μ thick, considerably thicker than those of the fungus described above. Neither hyphopodia nor setae are mentioned in the original description, and no specimen was available for comparison.

219. **Meliola Oncinotidis** Doidge nov. spec.

Plagulae epiphyllae, sparsae, aterrimae, plus minus rotundatae, 1–2·5 mm. diam. Mycelium ex hyphis reticulato-ramosis pellucide brunneis, 6–7·5 μ crassis, breviter articulatis, cellulis 15–25 μ longis compositum, ramis oppositis. Hyphopodia capitata numerosa, opposita, alternantia v. unilateralia, recta, rarius leniter curvata, 15–20 μ longa; cellula inferiore cylindracea, 3–5 μ longa, 6–9 μ lata, superiora ovata, rarius cylindracea, v. paullo irregulari, 12–15 μ longa, 6–9 μ lata. Hyphopodia mucronata modice evoluta, opposita v. unilateralia, haud pallidiore, ampullacea, recta v. gibbosa, 15–22·5 μ longa, basi 6–9 μ ata, subito in collum rectum v. curvatum, 5–9 μ longum et 2–4 μ latum attenuata. Setae myceliales numerosae, rectae v. plus minus curvatae, 250–500 μ longae, inferne 7·5–9 μ latae, obscure brunneae, subopacae, sursum pallidiores, pellucidae, sensim leniterque

attenuatae, ad apicem 5-6 μ latae interdum simplices obtusae, plerumque dentibus 2 mox brevibus 2·5–6 μ tantum longis mox elongatis tunc 12·5–47·5 μ longis praeditae. Perithecia in centro plagularum pauca, aggregata, globosa, atra, 150–220 μ diam., pariete e cellulis convexis composito. Asci 2-spori, Sporae brunneae, oblongae, 4-septatae, utrinque rotundatae, constrictae, 39–45 × 14–16 μ.

Hab. in foliis *Oncinotidis inandensis*, Zululand, leg. Gerstner, 33509.

Fig. 5.—*Meliola Oncinotidis*, mycelium with capitate and mucronate hyphopodia; tips of mycelial seta e spores.

Colonies epiphyllous, dense, black, round, 1–2·5 mm. diam. Mycelium branching freely, becoming more or less closely reticulate, densely so in the centre of the colony. Hyphae deep olive-buff at the tips, becoming buffy-brown to tawny-olive, undulating, 6–7·5 μ thick, rather closely septate, cells 15–25 μ long, hyphae often narrowed somewhat near the septa. Branches usually opposite. Capitate hyphopodia numerous, opposite, alternate or unilateral, at right angles to the hypha or inclined towards it at an acute angle, straight, rarely slightly curved, 15–20 μ long; stipe cell cylindrical, 3–5 μ long, 6–9 μ broad; head cell ovate, rarely cylindrical with rounded apex or somewhat irregular, 12–15 μ long, 7·5–10 μ broad. Mucronate hyphopodia interspersed with capitate hyphopodia, opposite or unilateral, often opposite a capitate hyphopodium, not paler than the hyphae, ampulli-

form, straight or gibbous, 15-22·5 μ long, 6-9 μ thick at the base, constricted suddenly into a curved or straight neck, 5–9 μ long and 2–4 μ thick. Mycelial setae numerous, straight or abruptly bent at the base, sometimes slightly curved, more or less translucent throughout or sub-opaque near the base, 250-500 μ long, 7·5–9 μ thick and buffy-brown to olive-brown at the base, tapering gradually upwards to 5–6 μ and becoming paler, deep to dark buff; apex sometimes simple with blunt tip, most frequently bifid with teeth 2·5–6 μ long, or with longer tapering branches, 12·5–47·5 μ long, sometimes minutely and irregularly 3–4-dentate.

Perithecia more or less closely grouped in the centre of the colony, black, globose, carbonaceous, 150-200 μ diam., surface cells convex. Asci 2-spored, evanescent. Spores snuff-brown, oblong, 4-septate, broadly rounded at both ends, constricted at the septa, 39–45 × 14–16 μ.

on leaves of *Oncinotis inandensis* Wood and Evans, Zululand, *Gerstner* 2598, 33509; Buccleuch nr. Cramond, Natal, *Doidge*, 9722.

Material is unfortunately very sparse; on No. 9722, the Meliola is associated on the same leaves with *Asterina Oncinotidis*.

220. **Meliola peddieicola** Hansford.

Tropical Fungi I, Journ. Linn. Soc., London.

Colonies amphigenous, thin, dull black, effuse and irregular in outline. Mycelium loosely reticulate. Hyphae deep olive-buff at tips, becoming buffy-brown, slightly and

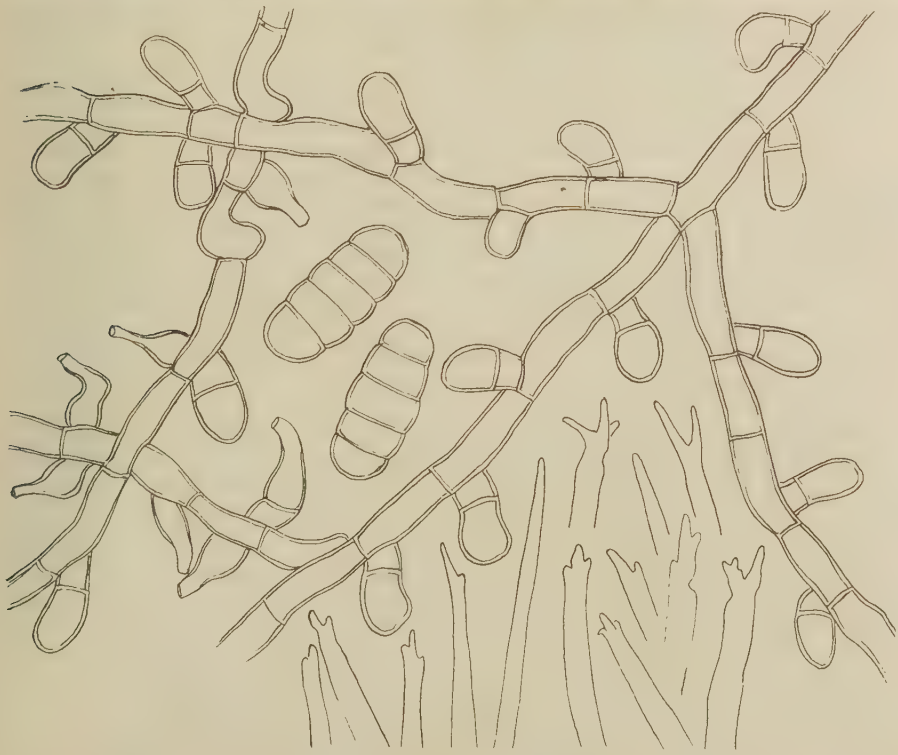


Fig. 6.—*Meliola peddieicola*, mycelium with capitate and mucronate hyphopodia; tips of mycelial setae; spores.

irregularly undulating, 5–7 μ thick, cells mostly 22·5–30 μ long. Capitate hyphopodia alternate, unilateral or occasionally opposite, straight or slightly curved, 17·5–22·5 μ long; stipe cell short, cylindrical, ca. 5 μ long and 5–6 μ thick; head cell 14–17·5 μ long and 7–10 μ broad, ovate or cylindrical. Mucronate hyphopodia not numerous, opposite, alternate or scattered, interspersed with the capitate hyphopodia and occasionally opposite to one of them, ampulliform, usually gibbous, rarely straight, 12·5–22·5 μ long, 6–7·5 μ broad at the base, constricted suddenly above into a neck which is 5–6 μ long and 2–2·5 μ thick. Mycelial setae not very numerous, mostly grouped round the perithecia, 300–450 μ long, straight but abruptly geniculate at the base, or slightly curved, olive-brown, sub-opaque and 7–9 μ thick at the base, tapering slightly and becoming somewhat paler towards the apex, which is translucent and buffy-brown; apex simple, acuminate, irregularly notched and toothed with usually 2–3 minute teeth, or definitely 2–3-furcate with branches 4–17·5 μ long; branches often uneven in length and one often bidentate.

Perithecia few, grouped in the centre of the colony, black, globose, carbonaceous, 130–160 μ diam., surface cells conical. Asci not seen. Spores 4-septate, cylindrical, not tapering or tapering very slightly to broadly rounded ends, slightly constricted at the septa, 35–39 × 12·5–15 μ.

on leaves of *Peddiea africana* Harv., Woodbush, *K. M. Putterill*, 32465 b.

221. **Balansia Trachypogonis** Doidge nov. spec.

Pseudosclerotia in gemmis e foliis plerumque tribus constitutis evoluta, semper solitaria, recta v. arcuata, cylindracea compressa, 1–3 cm. longa, basi lata folio obsessa, in media parte 2–3 mm. crassa, apicem versus sensim attenuata, atra, intus albida. Stromata convexa, variae magnitudinis plerumque partem dimidiam inferiorem pseudosclerotiorum sine spatio occupantia, subinde etiam fere ad apicem sclerotiorum producta, tota superficie ob ostiola peritheciorum dense minuteque verrucosa. Perithecia oblongo-lageniformia, immersa, dense stipata, e mutua pressione haud raro plus minus irregularia, 200–350 μ alta, 70–120 μ lata, superne subito in ostiola cylindracea v. anguste conica 100–130 μ longa attenuata; parietibus sub-hyalinis 12–16 μ crassis separata. Asci longe cylindracei, plerumque recti sed quandoque etiam curvuli, p. sp. 150–200 μ longi, ca. 5 μ lati, postice in stipitem tenuem attenuati, antice rotundati, tenuiter tunicati, ad apicem ca. 5 μ incrassati, 6–8-spori. Sporae tenuiter filiformes, longitudinem ascorum fere aequantes, 1·25–2·5 μ crassae, hyalinae, pluriseptatae, extra ascos facile in articulos secedentes.

Hab. in axillis foliorum semper ad nodos culmorum *Trachypogonis plumosi*, prope Pretoria, leg. Pole Evans, 9543 b.

Pseudosclerotia developing at the nodes of somewhat abnormal culms, which branch more freely than normal and have shorter internodes: often found at several successive nodes.

The pseudosclerotium develops in the leaf axil, round a bud which usually consists of three leaflets: two of these, overlapping slightly, are closely adherent to the back of the sclerotium, against the sheath, the third, still more or less involute, is embedded in the fungous tissue. As the sclerotium develops, it may be straight, but frequently becomes arched, forcing the sheath away from the stem: it is flattened cylindrical or horn-shaped 1–3 cm. long, with broad base attached to the leaf sheath, 2–3 mm. broad in the centre, tapering gradually to the apex, which may be free or enveloped in the sheath, surface black, white within. Stromata develop on the exposed side, that is, facing the stem, they are convex and vary in size, often covering the lower half of the sclerotium and extending towards the tip.

Internally the sclerotium is white, consisting of very closely interwoven hyphae, 2–2·5 μ thick: this structure continues into the stroma, but at the surface of the latter, there is a firm, dark purplish-brown cortex, 25–30 μ thick, covering the perithecia.

Perithecia immersed, oblong-lageniform, crowded, often compressed laterally or even irregular in form through mutual pressure; total length 300–430 μ; ascigerous part oval

to ellipsoid, 200–300 μ long, 70–120 μ diam., narrowed suddenly above into the ostiole. Ostiole cylindrical or narrow conical, straight or curved, not protruding, but fused with the cortex of the stroma, which is raised and hemispherical over the perithecium: ostiole traversed by a pore which is 15–20 μ broad at the base, 12–15 μ at the apex, lined with numerous hyaline periphyses. Perithecial wall almost colourless, not sharply differentiated from the stroma, but separating the perithecia by 15–20 μ. Asci numerous, long, cylindrical, rounded at the apex, tapering gradually at the base into a fine stalk, 6–8-spored, sp. part 150–200 μ long, ca. 5 μ thick, thin-walled, thickened at the apex to 5 μ. Spores hyaline, slender, filiform, almost equalling the ascus in length, 1·25–1·5 μ thick, pluriseptate, outside the ascus readily breaking into segments.

on *Trachypogon plumosus* Nees, Kaalfontein, *Pole Evans*, 9543 b, 9435, 10082, 28581; Johannesburg, *Bottomley*, 26607.

Urelytrum squarrosum Hack., near the old Standerton Road, *Pole Evans*, 8825.

? on *Andropogon amplectens* Nees, Meintjes Kop, *Mogg*, 25439.

Epichloe Volkensii P. Henn. [= *Ophiodothis Volkensii* (P. Henn.) Sacc.] described on *Exotheca abyssinica* from tropical Africa is probably a Balansia sp., and may possibly be identical with the fungus described on Trachypogon. According to the description, the stromata are somewhat similar but smaller, up to 1 cm. long and 2 mm. thick, perithecia subglobose, asci cylindrical, spores filiform. No measurements are given and the type was not available for comparison.

222. **Epichloe cinerea** Berk and Br.

Journ. Linn. Soc. 14 (1875) p. 111 (Fungi of Ceylon No. 982).

? Epichloe Zahlbruckneriana P. Hennings, Ann. Nat. Hist. Hofmus. Wien (1900) p. 1; Sacc. Syll. Fung. XVI: 607.

Epichloe Eragrostis Pole Evans, Ann. Bolus Herb. 2 (1918) p. 110.

Stromata usually enveloping and destroying the whole inflorescence, but occasionally partly developed spikelets can be seen incompletely covered by fungous tissue. Stromata sub-cylindrical, tapering to the apex, usually 4–8 cm. long and 2–3·5 mm. thick; on some hosts, e.g. *Bewsia*, shorter, 2–3 cm. long. Stroma white within; surface grey, smooth or somewhat verrucose to the naked eye: with a hand lens, the surface appears most frequently ashen grey, occasionally darker, rarely smooth, when dry traversed by undulating and anastomosing, more or less longitudinal grooves: rather closely set with punctiform ostioles, which are more or less seriate on ridges between the grooves, convex, protruding, shiny black, round to oval.

The centre of the stroma consists of a close fungous tissue, consisting of closely interwoven, fine, hyaline hyphae: in this are included the broken-down remnants of host tissues, the vascular elements being more or less intact. Towards the periphery, the stroma tissue is slightly tinted, and near the surface forms a cortex of still closer texture, greyish-fuscous to olive-grey in colour; there is a thin hyaline layer outside this cortex, which gives the stroma its characteristic grey colour.

Perithecia formed in large numbers in one layer near the periphery, flask-shaped, 250–350 μ long, including the ostiole, which is 90–100 μ long; ascigerous part ellipsoid to subglobose, 150–220 μ high, 90–170 μ broad. The ostiole protrudes slightly, but at the periphery is continuous with, and fused with the cortex of the stroma, which becomes convex at this point. Ostiole traversed by a pore, which is cylindrical or narrow conical, 25–40 μ broad at the base, 10–20 μ at the apex, lined with numerous hyaline periphyses. Asci fasciculate, cylindrical, rounded at the apex, tapering to the base, straight or curved, 6–8-spored, sp. part 90–175 μ long, 4–6 μ diam., mostly about 150 $\times$ 6 μ, thin-walled, thickened at the apex. Spores filiform, slightly curved, very variable in length, 35–87·5 μ long, rarely more than

[illegible] to the base, readily breaking apart at the septa; the segments, which are often 20–30 μ long, are distinguishable from the shorter spores by their truncate ends.

on *Bewsia biflora* Goossens, Rietvlei, Pretoria district, *Murray* and *Acocks*, 31249; Fountains Valley, *Mogg*, 11334; Kaalfontein, *Pole Evans*, 3543 a.

Cleistochloa eriocaulis Nees, Hunterville, *Stacey*, 32435.

Digitaria Brazzae Stapf, Marandellas, *Rattray* (Kh. 1855) 30111, det. Mason.

Digitaria longiflora Stapf, Groenkloof, *Pole Evans*, 11871.

Eragrostis chloromelas Steud., Pretoria, *Pole Evans*, 9139.

Eragrostis curvula Nees, Umzimkulu, *Browne*, 3628.

Eragrostis plana Nees, Kentani, *Pegler*, 2076, 2139, 2190; Tabamhlope, *West*, 30519; Mooi River, *Mogg*, 10663, 10676; Bot. Gardens, Durban, *Kent*, 15455; Mooding Siding, *Mainprice*, 22532; Tweedie, *Mogg*, 10666.

Eragrostis robusta Stent, Hopevale, *Morgan*, 27749.

Eragrostis scleroantha Nees, Donkerpoort, *Doidge* and *Bottomley*, 29761.

Eragrostis spp., Durban, *Baker*, 32016; Vereniging, *L. C. Turner*, 8577.

Microchloa caffra Nees, Groenkloof, *Pole Evans*, 11872.

Panicum natalense Hochst., Roberts Heights, *Mogg*, 33431.

Setaria nigrostris Dur. and Schinz, Groenkloof, *E. P. Phillips*, 14248.

Sporobolus capensis Kunth., Acton Homes, *L. A. Doidge*, 25287; Eshowe, *Gerstner*, 22580; Lidgetton, *Mogg*, 11637; Thorneville Junction, *Doidge*, 363.

Tristachya lichenaui Hack., Kaalfontein, *Pole Evans*, 3542.

on grass undet., Natal, *Medley Wood* 3559; Donnybrook, *Gordon*, 30790; Cramond, *Pole Evans*, 1353, 1355; Lidgetton, *Mogg*, 11639; Fairy Glen, *Lounsbury*, 17051; Skinner's Court, nr. Pretoria, *Pole Evans*, 745; Fountains Valley, *Mogg*, 11335; Orange Free State, *Nobbs*, 20310; Basutoland, *Dieterlen*, 11715, 18025; Mt. Inaizwa, *Krook* (R. Panther 2205, Type of *Epichloe Zahlbruckneriana* P. Henn.).

Epichloe occurs in South Africa on a wide range of grass hosts, but has not been found on any species of the Andropogoneae, which form a large proportion of the indigenous grasses. Numerous collections have been examined, and 12 numbers on various hosts studied in detail. The fungus appears to be most common in Natal and the eastern part of the Cape Province on species of *Eragrostis* and on *Sporobolus capensis*; the latter host is often so severely affected that it is difficult to find a normal flowering head.

I am indebted to Mr. E. W. Mason for notes on collections of *Epichloe* from Africa in the herbarium of the Imperial Mycological Institute and in Kew Herbarium. In a letter dated the 4th April, 1943, he writes:

"I have just compared this specimen (on *Digitaria Brazzae*, J. C. Hopkins, 1855) with three other specimens in our herbarium identified as above. They are (1) on *Sporobolus pyramidalis* from the Gold Coast; (2) on *Setaria aurea* from Kenya, and (3) on *Trichopteryx* sp. from Uganda (Maitland 470). They all seem to me identical in stromata, asci and ascospores with one another and with *Thwaites* 509 on *Eragrostis natans* from Ceylon (in Herb. Kew) which is the type of *Epichloe cinerea* Berk and Br.

"Revised descriptions of the species have been given by Petch (Ann. Roy. Bot. Gard. Peradinya VI, Pt. 2, p. 173: 1916) from the co-type, and by Sydow and Butler (Ann. Myc. IX, p. 394: 1911) from Indian material, which, however, is not available here.

"I am not quite sure how the asci and spores should properly be described. In all the specimens the asci vary in length from about 90–150 μ long, and are very close to

4 μ broad. In the shorter asci, the ascospores appear to be the length of the ascus, but free ascospores 150 μ long have not been observed. They are generally freed in portions 20–30 μ long, but this may be due to rough handling.

"From a note in our Herbarium, the asci of *Epichloe Eragrostidis* Pole Evans from South Africa (in Herb. Kew) on *Eragrostis* grass were [illegible]

A careful examination of numerous spores from fresh material indicates that the spores are not as long as the asci, as stated by Petch and by Pole Evans [illegible] the shorter asci; the maximum length observed was 97·5 μ. Field-collected spores are usually twisted together in the ascus and it is impossible to measure them accurately until they are free. They are nearly [illegible] and taper slightly to both ends, more gradually to the apex. [illegible] with truncated ends.

No. 11218, on *Setaria nigrirostris*, was [illegible] and Bommeljé (Bot. Jaarb. Suppl. Mededeel. II, p. 35, 1931) as *Epichloe Zahlbruckneriana* P. Henn. [illegible] by Hennings (*l.c.*), from culms of an undetermined grass found by [illegible]. The description of the stroma of this fungus does not differ in any essential from that of *Epichloe cinerea*; the asci are said to be 150–220 μ long, measurements which possibly include the sterile tapering base, in which case the fertile part would not exceed 175 μ in length; ascospores are said to be 0·5–1·0 μ thick, which is [illegible] given above, which were made from spores which had been immersed in 5 per cent. lactic acid. There is little doubt that *E. Zahlbrucknerana* is identical with *E. cinerea*, but unfortunately the type has not been available for comparison.

The conidial stage described by Hennings but not [illegible] Pole Evans "*stromatibus primo rubicundis conidiophoris*" evidently refers to the conidia-bearing mycelium of *Fusarium ciliatum*, which is frequently found covering large areas of the *Epichloe* stroma.

223. **Neopeckia Caesalpiniae** Doidge *nov. spec.*

Perithecia in subcuticular cellular [illegible] 4–5 μ crassa rubida, cellulis [illegible] cellulis 15–20 μ longis, simplicibus subsolida parietibus [illegible] 2–3 stratosis, ex [illegible] cellulis, primo globosis, demum [illegible] applanatis, circa 240–[illegible] μ diam. [illegible] [illegible] late [illegible] [illegible] [illegible]

more numerous, and usually longer, towards the base of the perithecium, flexuous or geniculate ; paler and more closely septate towards the apex, where they are rounded or slightly distended and subclavate (5-6 μ thick). Ostiole flat, almost crateriform, or rarely very broadly truncate conical ; the ostiole usually breaks away, and the broken edges form the rim of a flat, circular pore. Perithecial wall rough, consisting of several layers of flattened, polygonal cells, 4·5 12·5 μ diam., of which the outer layers are olive-brown, thick-walled and to which the hairs besetting the perithecium are attached. The inner layers are thin-walled, shading to dark olive-buff. The cells composing the ostiole are smaller.

The base of the perithecium is filled with a hyaline weft of fungous tissue, of which the structure is not evident and on which the asci and paraphyses are borne. Asci numerous, 8-spored, narrow-cylindrical, straight or curved, rounded at the apex, tapering to a rather long foot at the base, sp. part 100–125 × 10–11 μ ; wall tough, ca. 1 μ thick, slightly thickened at the apex, 2·5–3 μ.

Paraphyses very numerous, hyaline, filiform, flexuous, branched, exceeding the asci.

Spores obliquely monostichous, variable in form, ellipsoid, sub-clavate or sub-fusoid, broadly rounded at both ends or tapering somewhat, 1-septate, slightly constricted at the septum or barely so, 16–24 × 6–7·5 μ. Cells sub-equal, or, in the sub-clavate spores, the upper somewhat shorter and broader than the lower ; in clavate spores 20–22·5 μ long, the upper cell was 9–10 μ long and 7–7·5 μ broad, the lower 11–12 × 6 μ.

on fallen branches of *Caesalpinia sepiaria* Roxb., Town Bush Valley, *Doidge*, 34480.

224. **Englerula Macarangae** P. Henn.

Engl. Not. Jahrb. 34, p. 49 (1905).

Sacc. Syll. Fung. XVII : p. 529 ; Petrak, Ann. Myc. XXVI : p. 387 (1928).

Not on leaf spots ; colonies hypophyllous, scattered, round to irregular in outline, up to 6 mm. diam., rarely larger. Mycelium ahyphopodiate, more or less reticulate : closely reticulate in the centre of the colony, loosely reticulate near the margin. Hyphae buffy-olive to olive-brown, translucent, more or less deeply undulating, seldom almost straight, 2–4 μ thick, main hyphae occasionally 5-6 μ thick : sometimes two or more hyphae running parallel from strands.

Perithecia develop in the centre of the colony, often in groups of two or more which may be closely crowded, remaining discrete or becoming fused at the base, sub-globose or globose-ovoid, without ostiole. When immature, perithecia are 30–40 μ diam., dark-olive-brown at the base, paler above, consisting of roundish angular, rather thick-walled cells 3·5–6 μ diam., seldom up to 7 μ ; at maturity becoming mucose-diffluent and swelling up to a diameter of 100–200 μ. The wall becomes pale and translucent, and the asci are clearly visible. Asci few, usually 3–6, ovate, broadly clavate or oblong-ovate, broadly rounded at the apex, tapering slightly to the base which is sessile or apiculate and sometimes curved, 8-spored, wall tough and 2–2·5 μ thick, thickened (5–10 μ) at the apex, 60–80 × 35–50 μ. Spores distichous or imperfectly tristichous, oblong or oblong-clavate, broadly rounded at both ends, broader and more broadly rounded at the upper end, 1-septate, more or less constricted at the septum, long remaining hyaline, becoming buffy-olive : almost opaque, blackish-brown when mature, 25–36 μ long : cells equal length, the upper cell more or less ovoid, 15–17·5 μ broad, lower cell narrow ovoid or almost truncate conical and about 1–1·5 μ narrower than the upper.

Pycnidia (*Oothecium Macarangae* Petrak) round, very variable in size, mostly 30–100 μ diam., membrane becoming mucose-diffluent near the apex when mature. Conidia in smallest pycnidia single or few ; more or less numerous in the larger pycnidia. Conidia ovoid, ellipsoid, almost globose or oblong-clavate, broadly rounded above, often tapering somewhat to the lower end, which is rounded to truncate, 1-celled, 20-35 × 15-20 μ, buffy-brown to blackish-brown, with a dark spot at each pole, surrounded by a paler, almost hyaline zone. The conidia germinate at the poles.

on leaves of *Macaranga capensis* Benth., Eshowe, *Laughton*, 34112.

This is a tropical African species, recorded from tropical East Africa and from the Belgian Congo. This is the first time that it has been found as far south as Zululand. The polar zone in the conidia seems to correspond with the equatorial pale or hyaline zone found in many Asterostomella conidia and in conidia of *Oothecium stylosporum* (Cke.) Doidge (Bothalia 4, Pt. 2, p. 327).

225. **Didymella zuluensis** Doidge nov. spec.

Perithecia ramulicola, in maculis subatris irregulariter circularibus v. oblongis, 1–2 mm. latis, subinde saepe confluentibus et longioribus gregarie innata, globoso-depressa, 120–170 μ diam., 90–112 μ alta, atra, epidermide quasi clypeiformiter denigratula tecta ; ostiolo breviter conoideo haud prominulo 12–15 μ lato pertuso ; pariete atro-brunneo, 10–12 μ crasso, contextu obscure parenchymatico. Asci numerosi, 8-spori, oblongi, firme crasseque tunicata, antice rotundati, sessiles v. brevissime pedicellati, 45–55 × 6–7·5 μ. Sporae distichae, subfusoideae, utrinque leniter attenuatae, rotundatae, 1-septatae, haud constrictae, hyaline, 11–14 × 3–4 μ.

Hab. in ramulis *Eugeniae zuluensis* in sylvis Xumeni, prope Donnybrook, leg. Morgan and Doidge, 29840.

Perithecia rather loosely grouped on twigs, immersed, covered by the epidermis, which becomes slightly convex and discoloured dark brown to black. The perithecia are thus grouped on dark spots which are at first irregularly round to oblong and 1–2 mm. diam. ; these often become confluent, forming larger groups, which usually take the form of narrow, simple or branched, irregular ribbons running round the twig or diagonal to the axis.

Perithecia flattened globose, 120–170 μ diam., 90–112 μ high ; the host tissue on either side of the perithecia is permeated by dark brown hyphae 2–2·5 μ thick and the cell walls are discoloured dark brown ; the epidermal cells become black and opaque and almost clypeiform in appearance. Ostiole conical, not protruding, 25–45 μ long, ca. 35 μ broad at the base, at the apex opening by a more or less circular pore 12–15 μ diam. Perithecial wall dark brown, subopaque, 10–12 μ thick, obscurely parenchymatous, giving place suddenly within to a hyaline layer of equal thickness. Asci numerous, oblong, 8-spored, rounded above, tapering slightly at the base, sessile or very briefly pedicellate, with a firm thick wall, ca. 1 μ thick, slightly thickened at the apex, 45–55 × 6–7·5 μ. Spores distichous, subfusoid, tapering slightly to rounded ends, hyaline, 1-septate, not constricted at the septum, 11–14 × 3–4 μ ; cells equal in length or nearly so, but the upper cell is often slightly broader than the lower ; spores conspicuously biguttulate.

on *Eugenia zuluensis* Dummer, on twigs, Xumeni Forest near Donnybrook, *Morgan* and *Doidge*, 29840.

226. **Leptosphaeria Pterocelastri** Doidge nov. spec.

Maculae amphigenae, rotundatae vel irregulares, 5–10 mm. diam., interdum majores, in pagina folii superiore cinerascentes margine olivaceo-brunneo limitatae, in inferiore avellaneae. Perithecia epiphylla sparsa, parenchymate immersa, epidermide tecta dein ostiolo papillato tenuissime prominula, globosa v. globoso-depressa, 200–250 μ diam., 125–185 μ alta, contextu parenchymatico, pellucido, olivaceo-brunneo, ex cellulis compressis 10–15 × 2·5–5 μ composito. Asci octospori, cylindracei, recti v. curvati, apice rotundati incrassati, brevissime crasseque pedicellati, plerumque ex basi perithecii evoluti, 75–100 × 7·5–10 μ, paraphysati. Sporae oblique monostichae, oblongae, utrinque late rotundatae, 2-septatae, rarissime 3-septatae, ad septa haud constrictae, rectae v. vix inaequilaterae, olivaceae, 14–16 × 6–7 μ.

Hab. in foliis *Pterocelastri tricuspidati*, Knysna, leg. E. M. Laughton, 35142.

Leaf spots dry, round to irregular in outline, often marginal, 5–10 mm. diam., occasionally larger ; on the upper surface pale olive-grey with olive-brown border, avellanous on the under side of the leaf.

Perithecia epiphyllous, scattered or subgregarious, innate in the mesophyll of the leaf, the apex of the ostiole only rupturing the epidermis, but barely protruding. Perithecia globose or flattened-globose, 200–250 μ diam., 125–185 μ high. Wall membranaceous, deep olive, ca. 10 μ thick at the base, consisting of several rows (four or more) of flattened, thin-walled cells 10–15 μ long and 2·5–5 μ thick, paler and less distinct in structure above. Ostiole deep olive at the apex, papillate or truncate-conical, lined with fine, hyaline periphyses, pore indistinct.

Asci 8-spored, arising from the base of the perithecium, cylindrical, straight or curved, rounded and slightly thickened at the apex and with a very short thick foot, 75–100 × 7·5–10 μ. Paraphyses hyaline, exceeding the asci. Spores monostichous, slightly oblique, oblong, straight or somewhat asymmetrical, broadly rounded at both ends, often somewhat flattened at each pole, 2-septate, very rarely 3-septate, not constricted at the septa, 14–16 × 6–7 μ, at first hyaline, then dark olive-buff, olive-brown when fully mature.

on leaves of *Pterocelastrus tricuspidatus* Sond., Knysna, *E. M. Laughton*, 35142.

Closely associated, on the same leaf spots, with *Pestalotia Pterocelastri* Laughton, and with other fungi.

227. **Mycosphaerella Agapanthi** (Kalchbr. and Cooke) Landau.

in Engler and Prantl, Naturl. Pflanzenfam. 1 Teil, 1 Abt. (1897) p. 427.

Sphaerella Agapanthi Kalchbr. and Cooke, Grevillea 9 (1880) p. 31.

Perithecia developing on leaf spots, which are at first light brown, poorly defined, scattered over the leaf surface, elliptic and up to 4 mm. long. The leaf spots increase in size and become smoke-grey as the perithecia develop, often running together, especially near the leaf tips and covering large areas of the leaf surface.

Perithecia closely and irregularly set in the leaf spots, shining black, round, punctiform, discrete or in small, close groups of 2–4, rarely more ; developing under the epidermis and becoming more or less erumpent, flattened globose, 80–100 μ diam., 60–75 μ high ; ostiole very short, 10–15 μ long, broadly and truncately conical, periphysate within and with a more or less round pore ca. 15–20 μ diam. Perithecial wall firm, membranous, composed of several layers of large, blackish-brown, pellucid, thin-walled, roundish-angular or somewhat elongated cells, 7·5–12·5 × 7·5–10 μ ; the cells are compressed laterally to a thickness of 2·5–5 μ ; wall 7·5–12·5 μ thick at the base, sometimes only slightly thicker above, sometimes spreading out on either side to a radius of 30 μ just under the cuticle, and around the ostiole which protrudes only slightly. On the outside, the perithecial wall is connected with hyphae which penetrate right through the leaf tissues ; these hyphae are fuscous, mostly 5–6 μ thick, frequently branched and septate and more or less tortuous. Within the perithecial wall, the ascigerous layer is quite hyaline.

Asci not very numerous, ovate or ellipsoid, straight or curved, rounded at both ends, often broader and more broadly rounded at the base and tapering somewhat to the apex, sessile or with a very short, knob-like foot, 8-spored ; wall thin, 1 μ or less, but firm, slightly thickened (2·5 μ) at the apex. Spores distichous, hyaline, oblong or oblong-clavate, rounded at both ends, often slightly broader above, tapering slightly and gradually downwards, more or less equally 1-septate, not constricted at the septum or barely so, 15–20 × 4–5 μ, mostly ca. 17·5 × 5 μ.

on *Agapanthus africanus* Hoffm., on leaves, Kentani, *Pegler 2366*, 9167 ; Durban, *van der Byl*, 31954 a.

The original collection is *MacOwan 1342*, collected at Somerset East. The portion of this collection in the Pretoria herbarium is labelled *Pleospora herbarum* Rabenh. ; unfortunately this material is in very poor condition and quite unfit for study. There are no asci nor spores, these having apparently been destroyed by bacteria, and even the perithecia

are partly broken down. The fungus has been re-described from No. 9167. The spores are somewhat larger than stated by Kalchbrenner and Cooke (15–18 × 3 μ), but possibly the material which they examined was not quite mature.

228. **Mycosphaerella Moelleriana** (Thuem.) Lindau.

in Engler and Prantl, Naturlich. Pflanzenfam. 1 Teil, 1 Abt. (1897) p. 425.

Perithecia on light brown or greyish-brown leaf spots, which are round to irregular in outline, up to 10 mm. diam., becoming dry and surrounded by a narrow raised margin of a darker brown. These spots are scattered, but often numerous, becoming coalescent and thus larger and very irregular in outline ; in extreme cases the greater part of the leaf surface is involved.

Perithecia amphigenous, but mostly hypophyllous, usually very numerous, closely and irregularly grouped ; less frequently only a few perithecia develop on each spot. Perithecia at first immersed, covered by the slightly raised epidermis, shining black, punctiform ; later the epidermis ruptures and they are more or less exposed, or it remains covering the perithecia, which are then punctiform-erumpent only by means of a papillate ostiole. Perithecia minute, globose, 75–90 μ diam. Perithecial wall 10–12 μ thick, dark brown, membranous, composed of several layers of thin-walled, brown, polygonal cella, 5–10 μ diam. ; these are somewhat compressed laterally and ca. 2·5 μ thick. Ostiole verruciform, not prominent in erumpent perithecia, papilliform in those which remain covered by the epidermis and up to 20 μ long, 15–20 μ broad and traversed by a more or less circular pore ca. 10 μ diam. Asci fasciculate, obovate to obclavate, broadest near the base, tapering somewhat to both ends, but more definitely towards the rounded apex, 8-spored, sessile or sub-sessile, with a firm thick wall, 30–40 × 12–15 μ. Spores distichous, oblong-clavate, hyaline, rounded at both ends, but more broadly rounded above and tapering gradually downwards, equally or sub-equally 1-septate, not constricted at the septum or barely so, upper cell somewhat broader than the lower, 10–13 × 2–3 μ.

on *Eucalyptus gigantea* Dehnh., Hogsback, 20620.

Eucalyptus globulus Lab., Cedara, 26116, 26117, 26118, 26131 ; Natal Native Trust Forests, 26125 ; Hilton Road, 26127, 26128 ; Merrivale, 26129, 26130 ; Krugersdorp, 32202.

Eucalyptus Maidenii F. Muell., Birnham Woods, Merrivale, 26126 ; Berlin, Cape, 23664 ; Cedara, 26119 ; Jessievale, 26107.

Eucalyptus saligna Sm., Natal Native Trust Forests, 26123.

Eucalyptus Stuartiana F. Muell., Cedara, 26120.

Eucalyptus tereticornis Sm., Natal Native Trust Forests, 26124.

Eucalyptus sp., Harding, *Wilding*, 28787.

The above specimens were all collected by officers of the Forestry Department, the majority by the Forester at Cedara. A number of the collections show only immature perithecia, others are in good condition, the best material being Nos. 26112, 26123 and 26124. A collection on *Eucalyptus corynocalyx* F. Muell. and one on *Eu. maculata* Hook., both from Cedara, are probably the same fungus, but the perithecia are undeveloped. The characters and measurements of the fungus agree very closely with those given in the Sylloge Fungorum I : 491, a detailed study having been made of three collections in three different species of Eucalyptus.

In the South African Journ. Science 30 (1931) p. 227, *Mycosphaerella Moelleriana* is described by Verwoerd and du Plessis ; they found the perithecia considerably larger (Perithecia 163–248 μ, asci 34–43 × 6–7 μ and spores 10–20·5 × 3·4–4 μ). This form would appear to be intermediate between the typical *M. Moelleriana* and var. *megalospora* da Camara (Syll., Fung. XXII : 125) with asci 50–60 × 18–20 μ and spores 20–25 × 6–8 μ.

According to observations made by Forest officers, *Eucalyptus globulus* is more susceptible to attacks by this fungus than other species. In December, 1930, it was noticed that leaf spots were very numerous in some stands of this species of Eucalyptus and that they were beginning to develop in others; at this time, some of the very young coppice shoots had been almost completely defoliated; by February the position was worse and there was much defoliation in the young coppice growth. The fungus attacked chiefly developed juvenile leaves; leaf spots were rare on leaves which still retained their juvenile glaucous covering and on semi-mature leaves; leaf spots develop rapidly on coppice growth after a rain or a few days of mist, especially if a spell of hot weather follows a good rain.

229. **Mycosphaerella Plectranthi** Doidge nov. spec.

Maculae amphigenae, sparsae, distinctissimae, orbiculares v. irregulares, saepe confluentes, pallide brunneae, usque 3·5 mm. diam. Perithecia semper epiphylla, pauca, irregulariter laxeque dispersa, sub epidermide evoluta, tandem sublibera, globosa, 75–85 μ diam.; ostiolo plano papilliformi tandem poro rotundo 10–12 μ aperto; pariete 5–10 μ crasso, e stratis 2 3-cellularum rotundato- vel irregulariter angulatarum pellucide olivaceo-brunnearum 5–7·5 μ diam., 2·5–4 μ crassarum composito, intus subito in contextum hyalinum fibrosum transeunte. Asci sat numerosi, ellipsoidei v. clavati, antice late rotundati, postice leniter attenuati, subsessiles v. breviter crasseque pedicellati, 8-spori, p. sp. 32·5–40 × 7–9 μ. Sporae distichae, oblongo-fusoideae vel subclavatae, utrinque obtuse rotundatae, antice vix vel leniter, postice distincte attenuatae, rectae v. subrectae, circa medium septatae, vix constrictae, hyalinae, 10–13 × 2–2·5 μ. Paraphyses haud visae.

Hab. in foliis *Plectranthi fruticosi*, in sylvis Knysna, leg. Bottomley, 32253.

Perithecia on leaf spots, which are very well defined, scattered or often confluent, visible on both sides of the leaf, round to irregular in outline, light brown, up to 3·5 mm. diam. Perithecia always epiphyllous, not numerous, irregularly scattered on the leaf spots and usually distant from one another, at first immersed, later becoming more or less free, globose, 75–85 μ diam.; ostiole short, flat, papilliform, 15–18 μ long, with a more or less round pore, 10–12 μ diam. Perithecial wall 5–10 μ thick; at the base consisting of 2–3 layers of angular, more or less round or irregular cells, pellucid olive-brown, 5–7·5 μ diam., somewhat flattened and 2·5–4 μ thick; towards the ostiole the wall is somewhat thicker. Asci fairly numerous, ellipsoid or clavate, straight or curved, broadly rounded above, tapering slightly to a briefly pedicellate base, 8-spored, sporiferous part 32·5–40 × 7–9 μ. Spores distichous, hyaline, oblong-fusoid or sub-clavate, tapering very slightly to the upper end, more definitely to the lower end, more or less equally septate, very slightly constricted at the septum, upper cell often slightly broader, especially just above the septum, often slightly curved, 10–13 × 2–2·5 μ. Paraphyses not seen.

on *Plectranthus fruticosus* L'Herit., on leaves, Knysna, *Bottomley*, 32253.

230. **Physalospora Sapii** Doidge nov. spec.

Perithecia amphigena, plerumque hypophylla, sine maculis sed decolorationes interminatas efficientia, laxe dispersa, epidermide obtecta, globoso-depressa, 100–150 μ diam., 85–100 μ alta, poro pertusa; pariete membranaceo variabile crassitudine, e stratis numerosis cellularum composito, cellulis sat compressis, rarius globoso-angulatis, 4–15 μ longis, 5–10 μ latis tenuiter tunicatis, extus brunneis intus hyalinis. Asci clavati, recti v. curvati, 8-spori, crasse tunicati (ca. 1·5 μ) ad apicem leniter incrassati, 2·5–3 μ, superne late rotundati, inferne sensim attenuati, breviter pedicellati, 40–50 × 10–12·5 μ. Sporae distichae, hyalinae, fusoideae, continuae, utrinque obtusae v. truncatae, 12–15 × 4–5 μ. Paraphyses paucae mox mucosae.

Hab. in foliis *Sapii reticulati*, Eshowe, leg. Laughton, 33543.

Perithecia amphigenous but mostly hypophyllous, not on leaf spots, but causing a vague discolouration of the leaf tissues, scattered, usually distant, at first completely immersed

and covered by the epidermis, which becomes raised and convex over the perithecia ; later more or less erumpent. Perithecia flattened-globose, 100-150 μ diam., 85-100 μ high, at first closed, then opening by an apical pore, not papillate. Perithecial wall varying in thickness ; outer wall 12·5–20 μ thick, composed of a few, usually 2-4, rows of indistinctly oblong, less frequently globose-angular, thin-walled, blackish-brown cells, 4-15 μ long and 5–10 μ broad ; these give place internally to a number of rows of thin-walled, hyaline cells similar in form and finally to an indefinite concentric fibrose structure near the asci. Externally the perithecia are connected with rather sparse, smoke-brown hyphae, 4–6 μ thick, which penetrate between the cells of the host.

Asci 8-spores, clavate, thick-walled, ca. 1·5 μ thick, broadly rounded above and somewhat thickened, 2·5–3 μ, straight or curved, slightly attenuate to a pedicellate base, 40–50 $\times$ 10–12·5 μ. Spores distichous, fusoid, continuous, hyaline, tapering more or less to obtuse or truncate ends, sometimes asymmetrical, 12·5–15 $\times$ 4–5 μ. Paraphyses sparse, disappearing early.

on leaves of *Sapium reticulatum* (Hoschst.) Pax., Eshowe, *E. M. Laughton*, 33543.

231. **Pleospora Dyeri** Doidge nov. spec.

Perithecia irregulariter laxeque sparsa, plerumque solitaria, raro bina vel pauca aggregata, profunde immersa, depresso-globosa vel late ellipsoidea, 220-300 μ diam., 150-200 μ alta, ostiolo papillato vertice obtuso hyalino, 25-37·5 μ longo, poro irregulariter orbiculari 12-30 μ lato aperto punctiformiter erumpentia ; pariete membranaceo, 17-25 μ crasso, parenchymatice e pluribus stratis cellularum angulatarum pellucide brunnearum, 6–15 μ metientum composito. Asci sat numerosi, clavati, antice late rotundati, postice sensim attenuati, breviter stipitati, firme crasseque tunicati, 6–8-spori, p. sp. 100–125 $\times$ 40–45 μ. Sporae distichae, oblongae v. ellipsoideo- oblongae, antice late rotundatae v. subacutae, postice rotundatae, medio leniter constrictae, 7-septate, cellulis 4–6 mediis septo quodam longitudinali praeditae, 42·5-50 $\times$ 18-20 μ. Paraphyses vix numerosae, filiformes, hyalinae, ca. 1 μ crassae, mox mucosae.

Hab. in caulibus emortuis *Euphorbia triangularis*, prope Grahamstown, leg. R. A. Dyer, 23615.

Perithecia very widely distributed over the whole surface of the stem, which becomes light brown and dry, discrete or in more or less close groups of 2 or more, black, punctiform.

Perithecia deeply immersed, the epidermis becoming slightly raised and convex over each perithecium, flattened globose or broadly ellipsoid, 220–300 μ diam., 150-200 μ high. Ostiole hyaline, papillate, obtuse at the apex, 25–37·5 μ long, punctiform erumpent by means of an irregularly round pore 12-30 μ broad. Perithecial wall membranous, uneven outwardly where it is in close contact with the cells of the host and is connected with light fuscous to hyaline hyphae 2·5–4 μ thick, which penetrate into the stem tissues ; wall 17–25 μ thick, composed of several layers of somewhat flattened, thin-walled, pellucid, purplish-brown, angular cells, 6-15 μ diam. Asci fairly numerous, up to about 16 in each perithecium, clavate, broadly rounded above, tapering gradually downwards and then constricted suddenly into a short, knob-like foot, 5-10 μ long and about 10 μ broad, with a firm wall, 1·5–2 μ thick, slightly thickened, 5–6 μ, at the apex, 6–8-spored, sp. part 100-125 $\times$ 40-45 μ. Spores distichous, brown, oblong or ellipsoid-oblong, broadly rounded or subacute above, rounded below, at first transversely 3-septate and slightly constricted at the septa, then 7-septate ; the central 4-5 cells become also longitudinally septate ; spores 42·5–50 μ long, the upper half broader, 18–20 μ thick, the lower 15–18 μ thick. Paraphyses not very numerous, filiform, hyaline, ca. 1 μ thick, disappearing early.

on stems of *Euphorbia triangularis* Desf., near Grahamstown, *R. A. Dyer*, 23615.

232. **Anthostomella capensis** Doidge nov. spec.

Maculae magnae saepe apicales, plus minus effusae, usque 15 cm. longae, 1–2·5 mm. latae, pallide griseo-brunneae, linea marginali atrobrunnea limitatae. Perithecia amphi-

gena, plerumque epiphylla, hinc inde in greges variae magnitudinis irregulares laxe interdum seriatim disposita, omnino innata, profunde in mesophyllo immersa, vix vel leniter depresso-globosa, 140–240 μ diam., 110–150 μ alta, praecipue in epiphyllo clypeo elliptico atro-brunneo usque 250 μ longo, pro maxima parte in epidermide formato tecta ; ostiolo cylindraceo, 45–62·5 μ longo, 55–60 μ crasso, intus copiose periphysato poro rotundo ca. 20–25 μ lato pertuso, punctiformiter erumpentia ; pariete membranaceo, 9–12·5 μ crasso, e pluribus stratis cellularum valde compressarum extus dilute flavo-vel olivaceo-brunneolarum intus omnino hyalinum composito, ad apicem clypeo connato. Asci sat numerosi, cylindracei, antice late rotundati, postice subito in stipitem brevissimum contracti, tenuiter tunicati, 70–95 × 9–12 μ. Sporae oblique monostichae, oblongae v. ellipsoideae, utrinque haud vel vix attenuatae, late rotundatae, continuae, pellucide brunneae, sine appendiculis, 11–15 × 6–7 μ, lateraliter compressae e latere visae 4–5 μ crassae. Paraphyses sat numerosae, filiformes, mox mucosae.

Hab. in foliis *Phoenicis dactyliferae*, Port Elizabeth, leg. Doidge, 1236.

On leaf spots, usually spreading from the tips of the leaves to a length of several centimetres (up to 15 cm.) and 1–2·5 mm. broad, pale greyish or greyish-brown, the discoloured area being surrounded by a dark brown line.

Perithecia mostly epiphyllous, in groups of varying shape and size, sometimes more or less seriate, completely immersed, occupying one-half to two-thirds of the thickness of the leaf. Perithecia globose or somewhat flattened-globose, 140–200 μ diam., 110–150 μ high ; covered by a blackish-brown, elliptical clypeus, up to 250 μ long, developed chiefly in the epidermis. Ostiole broad, cylindrical, 45–62·5 μ long, 55–60 μ broad, copiously periphysate, punctiform erumpent by means of a pore 20–25 μ diam. and more or less round. Perithecial wall rather delicately membranous, 9–12·5 μ thick, formed of a number of layers of strongly compressed cells, outer layers pale yellow-brown or olive-brown, inner quite hyaline ; at the apex fusing with the epidermal clypeus. Asci fairly numerous, cylindrical, broadly rounded above, at the base constricted suddenly into a very short foot, with a firm thick wall, 70–95 × 9–12 μ. Spores obliquely monostichous, oblong to ellipsoid, not tapering to the rounded ends or very slightly so, brown, continuous, 11–15 × 6–7 μ ; compressed laterally, 4–5 μ thick when seen from the side. Paraphyses fairly numerous, filiform disappearing early.

on leaves of *Phoenix dactylifera* Linn., Port Elizabeth, *Doidge*, 1236.

233. **Anthostomella Salaciae** Doidge nov. spec.

Perithecia longe lateque dispersa, decolorationes brunneas indeterminatas efficientia, greges minutes v. majores irregulares plerumque formantia, discreta vel connata, plus minus depresse globosa, saepe leniter irregularia, 250–400 μ diam., omnino innata, fere totam folii crassitudinem occupantia, in utraque pagina epidermidem leniter pustulatim elevantia, tantum ostiolo obtuse saepe truncato-conoideo vel vix cylindraceo 100–180 μ alto, in media parte 70–90 μ crasso, intus poro rotundo 20–25 μ lato pertuso, punctiformiter erumpentia ; pariete firme membranaceo plerumque 20–30 μ crasso, e stratis numerosis cellularum irregulariter v. rotundato-angulatarum 2·5–5 μ diam. metientum, olivaceo-brunnearum, plus minus pellucidum, ad vertice obscure brunnearum composito, cum epidermide fere clypeiformiter connato. Asci numerosi, cylindracei, antice rotundati, postice plus minus attenuati stipitati, tenuiter tunicati, ad apicem leniter incrassati (4–5 μ), 8-spori, p. sp. 100–125 × 10–12·5 μ. Sporae oblique monostichae usque subdistichae, oblongae, utrinque plerumque sat valide attenuatae, hinc saepe fusoideae, obtusae, haud appendiculatae, rectae v. inaequilaterae, continuae, pellucide olivaceo-brunneae, plerumque 35–42·5 × 5–7·5 μ. Paraphyses numerosae, filiformes, ca. 1 μ crassae, ascos superantes, sero mucosae.

Hab. in foliis *Salaciae Gerrardi*, Eshowe, leg. Laughton, 33546.

Perithecia distributed over large areas of the leaf surface, causing a rather vague brownish discolouration of the tissues, occasionally solitary, but more frequently in loose

irregular groups of 2 to 20, which are usually discrete but occasionally become confluent: groups of perithecia often in irregular series following the course of the veins of the leaf: the epidermis over the perithecia is greyish, with black pin points indicating the position of the ostioles.

Perithecia globose or flattened globose, often somewhat irregular in form, especially when in contact with a vein, 250–400 μ diam., completely immersed, occupying practically the whole thickness of the leaf and raising the epidermis on either side. Ostioles densely and often truncately conical, occasionally cylindrical, 100–180 μ long and 70–90 μ broad in the centre, copiously periphysate within, punctiform or papillate on the upper side of the leaf by a pore, which is usually 20–25 μ diam. Peritheccial wall firmly membranous, formed of numerous layers of roundish angular or irregular cells 2·5–5 μ diam., olive-brown, more or less pellucid, darker and often sub-opaque at the apex where it fuses with the discoloured epidermis: clypeus round ostiole sometimes poorly developed. Asci numerous, cylindrical, straight or curved, rounded above, 8-spored, sporiferous part 100–125 × 10–12·5 μ, tapering at the base to a stalk ca. 25–40 μ long: thin-walled, slightly thickened at the apex (4–5 μ). Spores obliquely monostichous to subdistichous, oblong or oblong-fusoid, tapering more or less to both obtuse ends, straight or somewhat asymmetrical, pellucid olive-brown, continuous, mostly 35–42·5 × 5–7·5 μ, occasionally 45–50 μ long. An occasional ascus was seen with ellipsoid spores 17–22·5 × 10–10·5 μ. Paraphyses numerous, filiform, about 1 μ thick, exceeding the asci.

on leaves of *Salacia Gerrardi* Harv., Eshowe, ***E. M. Laughton***, 33546.

234. **Phyllachora eragrostidicola** Doidge nov. nom.

Phyllachora Eragrostidis Doidge, Bothalia IV: 430 (1942) non Chandon.

on *Eragrostis curvula* Nees, Maruathes, Basutoland, *Hean*, 3242a: and on other Eragrostis spp.

The name *Phyllachora Eragrostidis* was given in 1939 to an American species by Chardon (Bol. Soc. Venez. Cien. Natur. 40: 17). The original description has not been seen, but the species is recorded from North America by Orton in Mycologia 36: 45, 1944. According to the description, the ascospores are 10–13 × 4·5–6 μ, smaller than those of the South African fungus, which are 12–15 × 6–7·5 μ.

235. **Diatrypella Morganae** Doidge.

Bothalia 4 (1941) p. 61.

on *Citrus sinensis* Osbeck, dead twigs of Valencia Late Orange, Mazoe, Bates (Bates 29 L/5/19 D) 33586.

The collection on citrus twigs cannot be distinguished from the type of *Diatrypella Morganae*, which was found on fallen wood in the indigenous forest in Natal. Part of the material on citrus is in excellent condition and the stroma better developed than in the type specimen.

For this collection and those cited under Nos. 235–237, I am indebted to Dr. G. R. Bates of the Citrus Experimental Station, Mazoe.

236. **Diatrypella natalensis** Doidge.

Bothalia 4 (1941) p. 60.

on *Citrus sinensis* Osbeck, twig of Valencia late Orange (Bates 29 T 10 16 A) Mazoe, 33583; branch of Valencia late Orange (Bates M 26 L A) Mazoe, 33581.

This species was originally described from a branch of *Citrus nobilis* collected in Natal.

237. **Peroneutypella infinitissima** (Kalchbr. and Cooke) Doidge.

Bothalia 4 (1941) p. 64.

Valsa infinitissima Kalchbr. and Cooke, Greyvillea 9 (1880) p. 28.

on *Citrus sinensis* Osbeck, dead branch of Valencia Late Orange with bark, from Grove 26 L. Mazoe, *Bates*, 33587.

This collection is of interest ; the fungus was previously known only from MacOwans' original collection " on dead branches of undet. tree ", Somerset East, *MacOwan 1344 a*.

238. **Valsaria Batesii** Doidge nov. spec.

Stromata sparsa vel plus minus aggregata, in cortice immersa, fere tantum cum ostiolis fasciculatim coalitis erumpentia, ambitu plus minus rotundata, hemisphaerico-pulvinata, 0·5–1·5 mm. diam., valsoidea, inferne e hyphis brunneis 6–7·5 μ crassis composita, superne parenchymatice e cellulis atro-brunneis 3–5 μ v. usque 10 μ diam. metientibus composita. Perithecia 5 25 in quoque stromate, monosticha, in stromate omnino immersa, conferta, ovoidea, oblongo vel e mutua pressione saepe applanata et irregularia, 200 250 μ diam., 300–400 μ alta, superne subito in ostiola cylindracea, valde convergentia et apice in discum nigrum fasciculatim conjuncta attenuata ; pariete 12·5–15 μ crasso, e pluribus stratis cellularum compressarum, pellucide olivaceo-brunnearum composito. Asci numerosissimi, cylindracei, p. sp. 75–85 μ longi, 9–10 μ lati, 8-spori. Sporae oblique monostichae, oblongae, utrinque late rotundatae, medio 1-septatae, haud vel vix constrictae, brunneae, leves, 9–14 × 6 7·5 μ, plerumque 12·5 × 6 μ. Paraphyses numerosissimae, hyalinae, filiformes, undulatae, ca. 1 μ crassae, ascos valde superantes.

Hab. in ramulis *Cinnamomi camphorae*, Salisbury, leg. G. R. Bates (Rh. 6762) 35296.

Stromata scattered or in small groups, immersed in the cortex, from which the apical disc becomes erumpent ; or the bark may break away, exposing the stromata which remain seated on the decorticated wood.

Stromata usually hemispherical, black, pulvinate, with rough surface, 0·5–1·5 mm. diam., contracted suddenly above into a disc 500–800 μ diam., through which the convergent ostioles of the perithecia pass ; verrucose at apex of disc, through the presence of slightly protruding, black-shining ostioles. Occasionally, in small stromata, there is a very short disc, and the common ostiole of the perithecia, covered only by the cortex of the stroma, protrudes about 500–600 μ ; occasionally, in larger stromata, the outer circle of convergent ostioles is only lightly covered in the disc and, with a hand lens, their course can be traced on the perimeter.

On the surface of the wood, there is a layer of horizontal hyphae, running parallel to the fibres of the host, extending far beyond the limits of the stroma and forming a black layer on the surface. They are dark olive-brown, 6–7·5 μ thick, frequently septate, with cells 10 25 μ long ; these give rise to hyphae which penetrate into the wood and are paler near the surface, hyaline where they penetrate more deeply into the tissues of the host.

The basal part of the stroma, between the host and the base of the perithecia, 300–400 μ deep in the larger stromata, in the smaller sometimes only 75–100 μ, consists of a framework of horizontal hyphae, similar to those on the surface of the wood and running parallel to one another. The spaces between these main hyphae, usually narrow, but not infrequently wider and irregular in form, are filled with plectenchyma formed of paler, closely interwoven hyphae. At the margin of the stroma, the dark hyphae curve upwards, become closely interwoven and form, on the outside of the stroma and disc, a rather irregular, opaque black cortex, to which fragments of the cortical tissue of the host adhere. The upper part of the stroma consists of a dark, thin-walled pseudo-parenchyma of roundish or angular cells, 3 5 μ diam. ; the cells of the disc are more loosely connected and become larger upward, up to 10 μ diam.

Perithecia 5–25 in each stroma, very closely crowded and not separated by stromatal tissue, circinate or arranged irregularly, oblong, ovoid or irregular in shape through mutual pressure, 300–400 μ high, 200–250 μ diam.; contracted suddenly above into cylindrical ostioles, which are 500-600 μ long—in smaller stromata occasionally up to 1,200 μ – strongly convergent, round to oval in section, 50–62·5 μ diam., lined with very numerous, ascending, fine hyaline periphyses. Ostioles usually becoming confluent, groups of 4–6 fusing into a common ostiole ca. 100 μ diam., expanding to ca. 150 μ at the apex, which is entire, not sulcate. Perithecial wall pellucid olive-brown, 12·5-15 μ thick, usually distinct from the stroma tissue and from the walls of adjoining perithecia, consisting of several layers of thin-walled, flattened cells 7·5–12·5 μ long, 2–2·5 μ thick.

Asci extremely numerous, lining the base and sides of the perithecial cavity, at sides reaching almost to the base of the ostiole, 8-spored, cylindrical, sp. part 75–85 × 9-10 μ, not staining blue with iodine. Paraphyses very numerous, hyaline, persistent, filamentous, slender, undulating, ca. 1 μ thick, not staining blue with iodine. Spores obliquely monostichous, or oblique in the upper part of the ascus, vertical in the lower, oblong, broadly rounded at both ends, olive brown, 1-septate, not constricted or barely so, smooth, 9–14 × 6–7·5 μ, mostly 12·5 × 6μ, cells equal or nearly so.

on twigs of *Cinnamomum camphora* Nees & Eberm., Salisbury, 1945, *G. R. Bates* (Rh. 6762) 35926.

239. **Valsaria Eucalypti** (Kalchbr. & Cooke) Sacc.

Syll. Fung. I (1882) p. 746; Doidge, Bothalia 4 (1941) p. 66.
Melogramma Eucalypti Kalchbr. & Cooke, Grevillea 9 (1880) p. 31.

on *Citrus maxima* Merr., on bark of Marsh grape fruit, unthrifty trees with incompatible bud unions (Bates P 22/A) Mazoe, 33588.

Prunus Armeniaca L., on bark, Pretoria, *C. P. v. d. Merwe*, 34120.

on dead branch of indigenous tree, Xumeni Forest, *Morgan & Doidge*, 34123.

The collection on Citrus shows no significant difference from the type on *Eucalyptus globulus* (Plate I.c.) The individual stromata are somewhat larger, and in structure they are rather more loosely woven; the stromatal hyphae are 2·5–3·5 μ thick near the perithecia and in the cortex, in the sterile part of the stroma they are 5–7·5 μ or even up to 8–10 μ thick; some thicker hyphae are also to be seen in the stroma of the type specimen of *V. Eucalypti*. Stromata on Prunus and on an indigenous tree are similar, on the latter host varying from small stromata like those of the type to large cushions up to 4 cm. long, 7 mm. broad and 5 mm. high.

Valsaria Eucalypti, with cinnamon brown, pulvinate stromata, is closely related to *V. Cinnamomi* (Ces.) Sacc.; the specimen of the latter species examined, on *Eugenia grandis* from Singapore (C. F. Baker, Fungi Malayana No. 496) 12164, is apparently part of the collection quoted in the Sylloge Fung. XXIV (1928) p. 764; it is very similar to the South African specimens, but the spores are consistently somewhat smaller, 10 11 μ long, spores of *V. Eucalypti* being predominantly 12·5 14 μ long, rarely 15 μ long as previously stated (Doidge l.c.); occasionally shorter spores 10 11 μ long are seen; spores 15 μ long are rare.

Valsaria hypoxyloides Rehm is another similar fungus, and according to Rehm (see Theissen, Ann, Myc. X: 12, 1912) is probably identical with *V. Cinnamomi*. The spores of *V. hypoxyloides* in the collection seen, from Porto Rico (Petrak, Myc. Gen. No. 100) 23336, are most frequently 14–15 μ long.

It has not been possible to examine type specimens of the two latter species, but it seems likely that there is only one rather variable species of Valsaria with the characters of *V. Cinnamomi*, namely pulvinate, cinnamon-brown stroma and verrucose spores without constriction at the septum. If this is the case, the correct name for the species would be *Valsaria Cinnamomi* (Ces.) Sacc., which was described by Cesati as *Melogramma Cinnamomi* in 1879.

240. **Prototyrium Tricalysiae** Doidge nov. spec.

Mycelium liberum nullum. Stromata amphigena, plerumque epiphylla, ambitu plus minus rotundata v. irregularia, usque 4 mm. diam., plana, crustacea, opace atra, ex hypostromate epidermali hyalino oriunda, pluries affixa. Hypothecium continuum planum fuscum, 5–6 μ crassum. Stratum tegens atro-brunneum, centro opacum, margine plus minus pellucide brunneum, ex hyphis subradiantibus vel fere maeandrice conjunctis, 4–6 μ crassis, cellulis 12·5–20 μ longis formatum. Asci numerosi, erecti, per stroma dense dispersi, haud in loculis collecti, ovati v. oblongo-clavati, antice late rotundati et incrassati, postice plus minus attenuati, sessiles v. subsessiles, firme tunicati, 8-spori, 50–60 × 20–25 μ. Sporae distichae v. subdistichae, oblongae, v. oblongo-clavatae, basim versus leniter et sensim attenuatae, 1-septatae, haud vel vix constrictae, leves, diu hyalinae, tandem subhyalinae v. dilutissime olivaceo-griseae, 20–23 μ longae, cellula superiore 7·5–9 μ longa et lata, inferiore 12·5–15 μ longa ad septum ca. 7·5–8 μ lata.

Hab. in foliis *Tricalysiae lanceolatae*, Umtentweni, Natal, leg. Wager 32676.

Fig. 7.—*Prototyrium Tricalysiae*, part of the edge of the covering membrance and two very young ascomata ; asci ; spores.

Free mycelium none. Stromata amphigenous, mostly epiphyllous, forming superficial crusts, more or less round to irregular in outline and up to 4 mm. diam., dull black, scattered, sometimes becoming confluent.

Covering membrane raised above the leaf surface to a height of 75 μ, flat at the margins. The central part is opaque black and structure not readily discernible ; it consists of more or less radiating or winding rows of cells and at maturity cracks irregularly, breaking into uneven fragments ; the margin of the covering membrane is irregular in outline and consists of irregularly radiating hyphae, which are more or less translucent, buffy-brown, tortuous and subtorulose, 4–6 μ thick with cells of uneven length, 12·5–20 μ long.

In contact with the cuticle of the leaf, there is a thin hypothecium, continuous throughout the stroma, deep to dark olive-buff and apparently consisting of a single layer of cells 5–6 μ thick. This is connected at many points, through the cuticle, with the hyaline epidermal hypostroma, which consists of closely interwoven hyphae 2·5–3 μ thick, filling the epidermal cells under the whole external stroma. From the epidermal hypostroma, fine hyphae penetrate more deeply into the leaf. Not infrequently a second stroma develops on the under side of the leaf, opposite to that on the upper surface ; this seems to indicate that the mycelium may penetrate through the leaf without extending laterally to any distance.

The hypothecium gives rise to very numerous asci, which are not grouped in loculi, but stand erect in the stroma. There are no definite paraphyses between the asci and the structure of the intervening tissue is not readily discernible ; it is brownish, and shows traces of a thread-like structure, having apparently broken down early into an almost structureless, greyish-olive, mucous mass.

Asci ovate to oblong-clavate, 8-spored, broadly rounded above, usually tapering slightly or more decidedly to the base, occasionally obovate and broader at the base, sessile or with a short, peg-like foot, with a firm wall, thickened round the apex to 5–6 μ, 50–60 × 20–25 μ. Spores more or less distichous, oblong or oblong-clavate, broadly rounded above, tapering gradually and slightly towards the rounded base, 1-septate, not constricted or very slightly so, smooth, long remaining hyaline, slightly tinted, smoke-grey at maturity, 20–23 μ long : upper cells shorter and broader, 7·5–9 μ long and broad, lower 12·5–15 μ long, ca. 7·5–8 μ broad at the septum and tapering somewhat downwards ; often germinating from the basal end in the ascus.

The stromata readily become detached from the leaf, or the central part may fall away, exposing somewhat discoloured leaf tissues surrounded by the margin of the stroma.

on *Tricalysia lanceolata* Schum., on leaves, Umtentweni, *Wager 192*, 32676 ; Louis Trichardt, *V. A. Putterill*, 11825 ; Woodbush, *Doidge*, 1782 ; Eshowe, *Laughton*, 33554.

The earlier collections of this fungus were immature.

241. **Cyclotheca Bosciae** Doidge.

Bothalia I, Part 4 (1924), 196.

The type specimen of this fungus is in rather poor condition, and spores examined were not quite mature ; they are said to be hyaline, 11·6–13·3 × 8·3 μ ; the figure for width, 8·3 μ, is obviously a clerical error, 5·3 being intended.

A more recent collection on the same host provides more abundant and more mature material ; the spores become fuscous when fully ripe and are 12–16 × 5–6 μ. This fungus has also been found in the north-eastern Transvaal on *Maerua Legatii* Burtt Davy.

In the genus Cyclotheca the spores are hyaline ; this fungus with light brown spores must therefore be transferred to the genus Hysterostomella and becomes :—

Hysterostomella Bosciae Doidge nov. comb.

Syn. *Cyclotheca Bosciae* Doidge l.c.

on *Maerua racemulosa* (A.P.DC.) Gilg. and Ben. (=*Boscia caffra* Sond.), Ebb and Flow, Wilderness, *Doidge*, 17125, Type ; Knysna, *Laughton*, 32839.
Maerua Legatii Burtt Davy, near Olifants River on the road from Tzaneen, Pilgrims Rest Distr., *Scott*, 34028.

The genus Hysterostomina, differs from Hysterostomella only in the presence of paraphyses in the mature ascomata, a character now not admitted as a generic distinction. Hysterostomina spp. must therefore be included in the genus Hysterostomella and the following South African fungi are affected by the change in nomenclature :—

242. **Hysterostomella tenella** Syd.

Ann. Myc. 10 (1912) p. 442.

Hysterostomina tenella Syd. in Theissen and Sydow, Ann. Myc. 13 (1915) p. 228.

on *Asparagus striatus* Thunb., Despatch, *Doidge*, 1241.

243. **Hysterostomella Oxyanthae** Doidge nov. comb.

Hysterostomina Oxyanthae Doidge, Bothalia 2 (1927) p. 232.

Morenoella Oxyanthae Doidge, Trans. Roy. Soc. S. Africa 8 (1920) p. 286.

on *Oxyanthus Gerrardi* Sond., Woodbush, *Doidge*, 1758, 17725, 28340.

244. **Hysterostomella opaca** (Syd.) Doidge nov. comb.

Hysterostomina opaca Syd., Ann. Myc. 22 (1924) p. 429.

on *Olea foveolata* E. Mey., Knysna, *van der Byl 1397, 2289.*

The genus Palawania was characterised by Sydow [Phil. Journ. Sci. (C) Botany, Vol. IX (1914) 171 and Ann. Myc. 13 (1915) p. 249] as follows :—

" Stromata superficialia, carbonacea, radiato-contexta, ex hypostromate subepidermali per stromata erumpenti oriunda, hypothecio tenui. Loculi rotundati, discreti. Asci paraphysati, octospori. Sporae phaeodidymae."

Two species were described.

Palawaniella [Doidge, Bothalia I (1921) p. 16] was said to differ from *Palawania* in the centrifugal arrangement of the stromata and in the epidermal rather than sub-epidermal hypostroma.

Hansford has re-examined the two species of the genus *Palawaniella* and reports that : " In *Palawaniella orbiculata* (Syd.) Doidge, the hypostroma consists of dark hyphae filling individual epidermal cells and connected with the ascoma by fine filaments and with each other by hyaline hyphae through and below the epidermis ; a few hyphae penetrate into the sub-epidermis."

" In *Palawaniella Dovyalidis* Doidge, the hypostroma is similar to that of *P. orbiculata* but with more penetration of the palisade tissue by the sub-epidermal hyphae."

It is obvious that the degree of penetration of the tissues by the hypostroma cannot be maintained as a generic distinction, nor is the centrifugal development of the stromata of any great significance. As indicated by Hansford (I.M.I. No. 15, 1946, p. 168.) in his key to genera of the *Polystomellineae*, the genus *Palawaniella* Doidge should be united with the genus *Palawania* Sydow, which consists of species with 2-celled, coloured spores and ascomata attached at several points, hymenia under distinct scutella and irregularly arranged ; there is no free mycelium.

The synonymy and host range of the South African species would then be as follows : —

245. **Palawania orbiculata** (Syd.) Doidge.

Seynesia orbiculata Syd., Ann. Myc. 10 (1912) p. 39.

Palawaniella Eucleae Doidge, Bothalia I (1921) p. 16.

Hysterostomina Eucleae (Doidge) van der Byl, S. Afric. Journ. Sci. 22 (1925), p. 192.

Palawania Eucleae (Doidge) Nel, Ann. Univ. Stellenbosch XX A 2 (1942) p. 22.

Palawaniella orbiculata (Syd.) Doidge, Bothalia IV (1942), p. 329.

on *Euclea lanceolata* E. Mey., Piesanghoek, *Bosman*, 25868 ; Rooiwal, *Bosman*, 29922.

Euclea macrophylla E. Mey., Howieson's Poort, *Doidge*, 12375.

Euclea natalensis A.DC., Letaba Drift, *Doidge*, 1808 ; New Agatha, 11384 ; Nelspruit, *Liebenberg*, 29910.

Euclea racemosa Murr., Cape Flats, *Dippenaar*, 33885.

Euclea spp., Knysna, *Bottomley* and *Laughton*, 32248 ; Grahamstown, *Otto* (Stell. 348).

246. **Palawania Dovyalidis** (Doidge) Nel.

Ann. Univ. Stell. XX A 2 (1942), p. 22.

Palawaniella Dovyalidis Doidge, Bothalia I (1924), p. 98.

on *Dovyalis rhamnoides* Harv., The Wilderness, *Doidge*, 17117 ; Bathurst Distr., *Doidge*, 12347 ; Knysna, *Laughton*, 32267, *v. d. Byl 2297* ; George, *Verwoerd* (Stell. 347).

The genus *Byliana* Dippenaar [Ann. Univ. Stell. VIII, A 2 (1930), p. 31, Illustr. 3] is said to differ from *Palawaniella* in its darker hypothecium and scattered stromata. As indicated above, the arrangement of the stromata does not seem to be of any great significance ; the hypostroma of *Byliana Halleriae* is similar to that of *Palawania orbiculata*. The colour and thickness of the hypothecium can hardly be regarded as a generic character. It is proposed, therefore, that the genus *Byliana* be united with *Palawania*. The species on Halleria then becomes :—

247. **Palawania Halleriae** (Dipp.) Doidge nov. comb.

Byliana Halleriae Dippenaar, Ann. Univ. Stell. VIII (1930), p. 32.

on leaves of *Halleria lucida* Linn., Bloukransrivier, *v. d. Byl 2496*, 33592 ; Knysna, *Verwoerd* (Stell. 345).

I am indebted to Dr. Dippenaar for the opportunity of examining the type specimen.

248. **Asterodothis solaris** (Kalchbr. and Cooke) Theiss.

The genus *Asterodothis* was established by Theissen [Ann. Myc. 10 (1912), p. 179] for the fungus described by Kalchbrenner and Cooke [Grevillea 9 (1880), p. 35] as *Asterina solaris* on *Olea verrucosa*.

In Annales Mycologici 13 (1915), p. 232, Theissen and Sydow cited as a synonym *Lembosia Albersii* P. Henn. on *Elaeodendron* ; the latter specimen has not been seen, but in Bothalia I (1921), p. 10, the writer included a number of collections of a fungus on *Elaeodendron* under this species. The spores are similar and there is a general resemblance in habit, but a more careful study shows that the fungus on *Cassine* (=*Elaeodendron*) is not *Asterodothis* but a dense form of the fungus described by Sydow as *Asterinella dissiliens* and later transferred to the genus *Asterina* [Bothalia IV (1942) p. 287] because of the presence of hyphopodia. (See also Hansford, l.c. p. 190.).

It seems that in South Africa at least, *Asterodothis solaris* occurs only on species of *Olea* ; the organs described as hyphopodia in some instances and in others regarded as rudimentary setae or bristles, are conidiophores. There are no true hyphopodia on the mycelium of *A. solaris*.

249. **Polyrhizon Pterocelastri** Doidge nov. spec.

Stromata amphigena, plerumque epiphylla, irregulariter laxeque sparsa, sine maculis, ambitu sat regulariter orbicularia, 1–4 mm. diam., raro confluendo irregularia et majora, e pluribus ascomatibus irregulariter circinantibus concreta, ex hypostromate subepidermale ubique sub stromate evoluta oriunda. Ascomata partialia dense conferta, orbicularia, usque 800 μ diam., pede centrali 35–60 μ lato, atrobrunneo, epidermide innata, strato tegente intense et opace atra, ad peripheriam e hyphis radiantibus subtortuosis leniter undulatis, 4–5 μ crassis contexto. Hypothecium fuscum, minute cellulosum. Loculi pauci, annulatim circa pedem ordinati, 80–100 μ alti, 150–300 μ diam. Asci sat numerosi, ovati v. ellipsoidei, raro clavati, antice late rotundati, sessiles v. brevissime pedicellati, 8-spori,

66–80 × 22·5–38 μ. Sporae distichae, intense olivaceo-brunneae, oblongo-clavatae utrinque rotundatae, 1-septatae, constrictae, 27·5–33 μ longae, cellula superiore ellipsoidea, 15–16·5 μ longa, 10–12·5 μ lata, inferiore oblonga v. subcuneata 12·5–16·5 μ longa ad septum 7·5–10 μ lata. Paraphyses persistentes filiformes, ascos superantes, ca. 1·5 μ crassae, ad apicem clavato incrassatae usque 2·5 μ latae.

Hab. in foliis *Pterocelastri Galpini*, Kromrivier, leg. Doidge et Bottomley, 32776.

Mycelium almost entirely sub-epidermal, composed of hyphae 2–2·5 μ thick; these become much branched and closely interwoven, forming an extensive and more or less dense hypostroma in the palisade cells; from the hypostroma, hyphae grow out and penetrate into the mesophyll of the leaf, often reaching the lower epidermis. The hypostroma becomes particularly dense in the sub-stomatal cavity; here it becomes blackish-brown and emerges through the stomata to the leaf surface at many points. These form the starting points of the partial stromata which develop centrifugally in round, crowded groups.

The compound stromata are mostly epiphyllous, scattered, 1–4 mm. diam., rarely confluent. The individual or partial stromata are round, up to 800 μ diam., with a blackish-brown, opaque central foot, 35–60 μ broad, connecting with the hypostroma. The covering membrane is deep black, opaque, carbonaceous and very brittle; at the sterile margin, which lies flat on the leaf surface or overlaps that of a neighbouring partial stroma, the radiating structure is more or less evident; it consists of radiating, pellucid brown, branching, somewhat undulating, tortuous hyphae, 4–5 μ thick. Hypothecium ca. 15–20 μ thick, fuscous to olive-brown, minutely cellular.

Loculi few, arranged in a circle round the central foot, 80–100 μ high in the centre, 150–300 μ diam. Asci fairly numerous, ovate or ellipsoid, rarely clavate, broadly rounded above, sessile or very briefly pedicellate, 8-spored, 66–80 × 22·5–38 μ. Spores distichous, deep olive-brown when mature, clavate-oblong, rounded at both ends, 1-septate, deeply constricted, 27·5–33 μ long; upper cell ellipsoid, 15–16·5 μ long and 10–12·5 μ broad; lower oblong or subcuneate, 12·5–16·5 μ long, 7·5–10 μ broad just below the septum and tapering somewhat downwards. Paraphyses persistent, filiform, exceeding the asci, about 1·5 μ thick, up to 2·5 μ thick at the clavate tips.

on *Pterocelastrus Galpini* Loes., Kromrivier, Rustenburg Distr., *Doidge* and *Bottomley*, 32776.

The two species of Polyrhizon previously described on South African hosts are *Polyrhizon Bewsii* Doidge on *Cassine* spp., and *P. Celastri* on *Gymnosporia acuminata* Szysz.; all three species occur on host genera belonging to the family *Celastraceae*.

250. **Echidnodes Curtisiae** Doidge nov. spec.

Epiphyllum, maculas orbiculares, sparsas, sat regulares, plerumque acute marginatas usque 7 mm. diam., in epiphyllo brunneas, zonula angusta atro-brunnea cinctas, in hypophyllo decolorationes flavo-brunneolas efformans. Mycelium intramatricalium profunde in mesophyllum penetrante, hypostromate fusco subepidermale efformans. Plagulae epiphyllae in centro maculae parum perspicuae. Mycelium liberum parce evolutum ex hyphis radiantibus laxe reticulatis, olivaceo-brunneis, sub-rectis v. curvatis, obscure septatis, 2·5–5 μ plerumque 4 u crassis compositum. Hyphopodia pauca, sparsa, continua, subglobosa v. pyriformia, 4–5 μ alta et lata. Thyriothecia pauca in centro maculae laxe dispersa, linearia, recta v. curvata, 350–1,000 μ longa, 150–200 μ lata, strato tegente convexulo, atro-brunneo, in parte centrali opaco, marginem versus ex hyphis radiantibus 2–3 μ crassis composito, margine haud fimbriato, rima longitudinali dehiscentia, membrana basali olicaceo-brunnea ex cellularum sat indistinctarum composita hypostromate subepidermali pluries affixa. Asci ovati sessiles, 8-spori, 30–33 × 15–17·5 μ. Sporae conglobatae, brunneae, oblongae v. subclavatae, utrinque rotundatae, 1-septatae, leniter constrictae, 15–17 × 5 6 μ.

Hab. in foliis *Curtisiae fagineae*, Deepwalls, Knysna, leg. Bottomley, 32131 a.

Causing scattered, more or less circular leaf spots, up to 7 mm. diam.; on the upper side of the leaf these are seal-brown with blackish-brown border; on the under side they are paler, army-brown to buffy-brown.

In the discoloured areas, the mycelium penetrates deeply into the host tissues. Light-brown hyphae, beneath the thyriothecia, form a sub-epidermal plate, which is connected with the basal membrane of the thyriothecia at many points by hyphae passing through the stomata, or between the epidermal cells and through the cuticle.

Superficial mycelium epiphyllous, rather sparse, radiating from the centre of the leaf spot, loosely reticulate, dark olive-brown to buffy-brown, almost straight or more or less curved, obscurely and rather frequently septate, uneven in thickness, 2·5–5 μ thick, mostly 4 μ. There are a few scattered hyphopodia, 1-celled, sub-globose or oval to pyriform, 4-5 μ high, 4–5 μ broad.

Thyriothecia epiphyllous, few, in the centre of the leaf spot and of the superficial mycelium, linear, 350–1,000 μ long, straight, curved or bent, 150–200 μ broad, 60–65 μ high in the centre. Covering membrane black, opaque, except at the margin, where it is formed of radiating hyphae, 2–3 μ thick; margin irregular but not fimbriate; dehiscing at maturity by an irregular, longitudinal fissure almost the length of the covering membrane. Basal membrane olive-brown, structure obscure. Asci ovate, sessile, 8-spored, 30–33 × 15–17·5 μ. Spores conglobate, buffy-brown, sub-cylindrical to sub-clavate, rounded at both ends, 1-septate, slightly constricted at the septum, 15–17 × 5–6 μ; loculi sub-equal in length or the upper slightly shorter and broader, the upper loculus sub-ovate, broader near the septum, the lower cylindrical. When the spores germinate, a hyphopodium is formed near the septum.

on leaves of *Curtisia faginea* Ait., associated with *Meliola ganglifera* Kalchbr., Deepwalls, Knysna, *A. M. Bottomley*, 32121 a.

Although a few hyphopodia are present, the extensive internal mycelium seems to place this fungus in the genus *Echidnodes*; compare Hansford's notes on *Lembosia durbana* v. d. Byl (Bothalia IV, p. 820.)

251. **Echidnodes transvaalensis** Doidge nov. sp.

Plagulae epiphyllae, atrae, sparsae, ambitu irregulares, usque ca. 2·5 mm. diam., haud acute definitae. Mycelium ex hyphis plus minus undulatis, dilute olivaceo-brunneis, indistincte septatis, 2–2·5 μ crassis compositum. Thyriothecia plerumque dense dispersa, haud raro dense conferta, oblonga, recta v. curvata, 200–420 μ longa et 80–100 μ lata, rima longitudinali dehiscentia, vel orbicularia, 80–125 μ diam.; strato basali tenui, sub-hyalino; strato tegente convexulo, pellucide brunneo, ex hyphis radiantibus 2–3·5 μ crassis, cellulis 3–5 μ longis composito, peripherice plus minus fimbriato. Asci numerosi, 8-spori, ovati, sessiles, forme tunicati, 22·5–35 × 10–12·5 μ. Sporae subdistichae v. conglobatae, oblongae v. oblongo-clavatae, antice late rotundatae, postice leniter attenuatae, 1-septatae, haud vel vix constrictae, leves, dilute olivaceo-brunneae, 10–12·5 × 4–5 μ, cellula inferiore plerumque leniter angustiore.

Hab in foliis *Eugeniae natalitiae*, Mariepskop, leg. Scott, 34027.

Colonies epiphyllous, scattered, thin, dull black, irregular in outline, poorly defined, up to 2·5 mm. diam. Mycelium delicate, radiating irregularly and becoming loosely reticulate, ahyphopodiate. Hyphae light greyish-olive or greyish-olive to dark olive-buff, 2–2·5 μ thick, more or less undulating, not infrequently running parallel to one another and forming loose strands of 2 or 3 hyphae; branching irregular; septation obscure and rather distant.

Thyriothecia fairly numerous, crowded in irregular groups, often becoming confluent; single thyriothecia linear oblong, straight, curved, bent at almost a right-angle or forked, 200–420 μ long and 80–100 μ broad, dehiscing by an irregular longitudinal crack, running almost the whole length of the covering membrane; or more or less circular in outline, 80–125 μ diam., dehiscing by irregular cracks radiating from a central pore. Basal membrane delicate, structure not evident. Covering membrane slightly convex, at first dark olive-buff, becoming olive-brown, more or less pellucid, but sub-opaque in the centre;

composed of radiating hyphae 2–3·5 μ thick, with cells 3–5 μ long; margin more or less fringed, the fringing hyphae not differing from those of the mycelium.

Asci very numerous, ovate, broadly rounded above, sessile or with a short peg-like foot, 8-spored, 22·5–35 × 10–12·5 μ, with a firm wall slightly thickened round the apex. Paraphyses breaking down early into an olivaceous mass without recognisable structure. Spores imperfectly distichous to conglobate, 1-septate, oblong to oblong-clavate, greyish-olive, 10–12·5 × 4·5 μ, smooth, not constricted at the septum or barely so, broadly rounded above, tapering somewhat to a rounded base; loculi more or less equal in length, but the upper slightly broader than the lower.

on leaves of *Eugenia natalitia Sond.*, Mariepskop, Pilgrims Rest district, *E. Scott*, 34027.

This fungus, which is very similar in habit to *Lembosia Wageri* Doidge, is very closely associated, on the same leaves with *Asterina natalitia* Doidge.

252. **Morenoina Dracaenae** Doidge nov. spec.

Epiphylla, maculas rufo-brunneas ellipticas v. suborbiculares usque 10 mm. longas, 6–8 mm. latas efficiens. Mycelium liberum nullum, intra-matricalium subcuticulare, radiante ex hyphis hyalinis v. fuscis, 2–4 μ crassis septatis cellulis 5–15 μ longis compositum Ascomata numerosa, densiuscule et centrice dispersa, haud raro 2–3 dense conferta et plus minus connata, primitus ambitu orbicularia vel elliptica, mox elongata oblonga, recta v. curvata, 170–500 μ longa, 150–200 μ lata, 70–85 μ alta, primo clausa dein rima longitudinale dehiscentia; strato tegente convexulo, opace atro-brunneo, marginem versus radiatim contexto ex hyphis 2·5–4 μ crassis contexto, peripherice copiose breveque fimbriato; strato basali subhyalino, 3–4 μ crasso. Asci 8-spori, ovati, 30–35 × 22–25 μ v. oblongo-clavati 40–50 × 15–20 μ, antice late rotundati, deorsum sensim attenuati sessiles. Sporae distichae v. imperfecte tristichae, oblongo-clavatae, utrinque late rotundatae, leves, 1-septatae, constrictae, diu hyalinae tandem olivaceo-brunneae, 20–22·5 μ longae, cellula superiore ovata, 9–10 μ longa, 6–7·5 μ lata, inferiore oblonga v. basim sensim attenuata, 11·5–12·5 μ longa 5–6 μ lata.

Hab. in foliis *Dracaenae Hookerianae*, Durban, leg. P. A. van der Byl (v. d. Byl 328).

The fungus causes reddish-brown leaf spots on the upper side of the leaf; these are elliptic to sub-circular in outline, up to 10 mm. long and 6–8 mm. broad. On the under side of the leaf there is no discolouration of the tissues, but they are concave under the leaf spots.

There is no superficial mycelium, but the thyriothecia are attached either in the centre, or at several points, to a sub-cuticular mycelium. This takes the form of sub-cuticular plates, one cell thick, hyaline to dark olive-buff and buffy-brown. It consists of straight or curved hyphae, 2·5–4 μ thick, with cells 5–15 μ long and rather frequently branched; through repeated branching the hyphae, which are fused by their lateral walls, form a radiating fan-shaped structure at the edge of the colony.

Ascomata epiphyllous, developing in concentric rings, very numerous, often crowded and becoming coalescent in groups of 2–3 or more; at first round to elliptic in outline, becoming oblong to oblong-linear, rounded at both ends, straight, curved or bent, 170–500 μ long, 150–200 μ broad, 70–85 μ high in the centre. Covering membrane convex, blackish brown, opaque, visibly radiating in structure towards the margin, briefly and densely fimbriate, consisting of hyphae 2·5–4 μ thick; at maturity splitting down the centre to form a longitudinal fissure running almost the length of the covering membrane; less frequently developing radiating cracks. Basal membrane sub-hyaline, 3–4 μ thick; structure not evident. Asci numerous, 8-spored, ovate, 30–35 × 22–25 μ, or oblong-clavate, 40–50 × 15–20 μ, the ovate asci being near the margin of the ascomata and the more elongated asci near the centre. Asci broadly rounded above, more or less tapering to the base, sessile, thin-walled, slightly thickened, up to 5 μ, round the apex. Spores distichous or imperfectly tristichous, clavate-oblong, broadly rounded at both ends, smooth, [illegible] maximum; hyaline, becoming dark olive-buff to buffy-brown, 1-septate, constricted

at the septum, 20–22·5 μ long ; upper cell ovate, 9–10 μ long, 6–7·5 μ broad ; lower cell oblong or tapering slightly downwards, 11·5–12·5 μ long, 5 6 μ broad ; the cells separate rather readily at the septum.

on leaves of *Dracaena Hookeriana* K. Koch, Durban, *van der Byl 328.*

253. **Bulliardella capensis** Doidge nov. spec.

Hysterothecia erumpenti-superficialia, carbonacea, sparsa vel gregaria, elliptica v. rotundata, utrinque obtusa, 400 750 μ longa, 400 500 μ lata, extus atra subnitentia rima longitudinali percursa, haud carinata. Asci 6 -8 spori, cylindracei v. clavati, apice rotundati, tenuiter tunicati, 125–150 × 20–30 μ, paraphysibus filiformibus, ramosis. Sporae recte v. oblique distichae, olivaceae, cylindraceae, utrinque rotundatae, 1-septatae, medio leniter constrictae, 47·5–52·5 × 11·5–13 μ, loculo superiore longiore et lenissime latiore.

Hab. in ramulis *Gymnosporiae procubentis*, Qolora, Transkei, leg. M. Gunn, 24136.

Hysterothecia scattered or more or less gregarious, erumpent to superficial, carbonaceous, shining black, elliptic to circular in outline, 400 750 μ long, 400 500 μ broad ; flattened elliptic in section and about 350 μ high ; traversed by a narrow longitudinal fissure, lips level or slightly incurved, not ridged. Walls thick, opaque, 50 75 μ thick at base and sides, becoming thinner above. Asci numerous, 6–8-spored, cylindrical to clavate, broadly rounded above, tapering at the base, or constricted abruptly into a short peg-like foot, thin-walled, 125–150 × 25–30 μ. Paraphyses delicate, filiform, branched. Spores subdistichous, parallel or oblique, grayish-olive to buffy-brown, cylindrical, rounded at both ends, 1-septate, slightly constricted at the septum, straight or slightly curved, 47·5 52·5 × 11·5 13 μ ; upper cell longer than the lower and slightly broader, cylindrical or broadening slightly above the septum, 26·5 29 μ long ; lower cell tapering somewhat to the base ; loculi separating readily at the septum.

on twigs of *Gymnosporia procumbens* Lees., Qolora, Transkei, *M. Gunn*, 34136 ; closely associated with *Lecanora* sp. and with other lichens ; an immature hysteriaceous fungus with longer ascomata and muriform spores was also found on the same twigs.

In " Observations on Species of *Bulliardella* " (Papers of Mich. Acad. Sci. Arts and Letters, Vol. 23, 1938, pp. 155–61) Lohman mentions five species of *Bulliardella*, of which four were previously known in Europe ; the fifth *B. nitida* (Ellis) Lohman is a North American species. With the exception of *B. sphaerioides*, found in Europe and North America on *Betula*, all are conifer-inhabiting fungi and all are comparatively small spored, with spores less than 20 μ long and 7 μ broad. There appears to be no previous record of this genus in the southern hemisphere. The spores of *B. capensis* are sometimes deeply constricted at the septum and the cells sub-pyriform in shape, very similar in form to those of *B. sphaeroides*, but they are much larger.

254. **Bulgariastrum africanum** Syd.
Ann. Myc. 13 (1915) p. 42.

Ascomata amphigenous and caulicolous, not on definite leaf spots, but causing an indeterminate, yellow-brown discolouration of the leaf tissues, very closely crowded in round groups, which are up to 5 mm. diam., or occasionally becoming confluent and irregular ; not infrequently interspersed with conidiiferous stromata in the same groups ; the latter are black, more or less round, pulvinate, the surface rough with many fissures and folds. The ascomata are sub-turbinate, at first gelatinous, hard and horny when dry ; disk waxy in appearance, with a raised black border. (Plate I *a* and *b*.)

The mycelium penetrating the tissues of the host is similar in character and extent to that of *Bulgariastrum bullatum*, but the internal stroma and the base of the external stroma is lime-green in colour and is translucent. The stroma is 250 -350 μ broad at the base, expanding rapidly upwards ; it may be simple, bearing one disk, branching to produce two or three disks, or with ascoma and conidia on one stroma. The ascoma expands rapidly upwards to a height of 400 -500 μ, the expanded disk being slightly concave or slightly

convex, varying from 300 μ to 1,000 μ in diameter; disk normally round, but in closely crowded groups it becomes elliptic through mutual pressure.

The central part of the stroma is lime green, parenchymatous in texture and composed of cells 12–18 μ diam., with a cortex of smaller cells, 7–12 μ diam., dusky blue-green in colour and externally rough and loosely connected.

Asci clavate, rounded above, 8-spored, 60–90 × 14–16 μ. Spores obliquely monostichous or incompletely distichous, hyaline, ellipsoid-oblong, 1-septate, not constricted at the septum or slightly so, rounded at both ends, 12–15 × 6–7 μ; cells equal or nearly so. Paraphyses filiform, thicker (3–4 μ) at the clavate tips, exceeding the asci and forming a dense, dusky green-blue epithecium.

The conidiiferous stroma is similar in structure to the ascoma, but pulvinate in form. Under the cortical cells cavities develop, 200–300 μ diam. and 200–300 μ high; the surface of the cavity, on all sides, is lined with conidiophores, which are simple, straight or slightly curved, cylindrical, ca. 10–13 μ long and 2–2·5 μ thick. Conidia borne singly at the tips of the conidiophores, hyaline, mostly clavate, rarely ellipsoid, straight or slightly curved, not tapering or tapering slightly to the rounded apex, tapering gradually towards the base, 11–25 × 3–5 μ; at first 1-septate, then 2–3-septate, often slightly constricted at the septa.

on *Capparis Rudatisii* Gilg. and Ben., Somerset East, *MacOwan 1273 b*, 20814; East London, *Doidge*, 12395.

The type specimen (Sydow l.c.) was collected by *Rudatis 1388* at Friedenau in Natal.

The conidial form is :—

Oncospora viridans Kalchbr. and Cooke.
Grevillea IX (1880), p. 19.
Nannfeldt, Nov. Act. Reg. Soc. Sc. Upsala, Ser. IV, Vol. 8 (1932), p. 86.
Sphaeropsis abnormis Berk and Thuem. in Thuem. Myc. Univ. No. 1675.
Ephelis viridans (Kalchbr. and Cooke) Sacc. Syll. Fung. III (1884), p. 691.
Sphaeropsis enormis Sacc., Syll. Fung. X (1892), p. 254.

The host of MacOwan's collections was said to be *Capparis Gueinzii*, but a careful comparison with authentically named specimens shows that it is *C. Rudatisii*; ascomata are present on the portion of the type collection of *Oncospora viridans* (MacOwan 1273 b) in the Pretoria herbarium. Conidia have also been found on :—

Capparis Rudatisii Gilg. and Ben., Olifantshoek, Uitenhage, *MacOwan* (*Sphaeropsis abnormis* in Thuem. Myc. Univ. 1675); Alexandria, *Doidge*, 22373.

Ascomata are formed more freely than those of *Bulgariastrum bullatum*, which is usually found in the conidial stage.

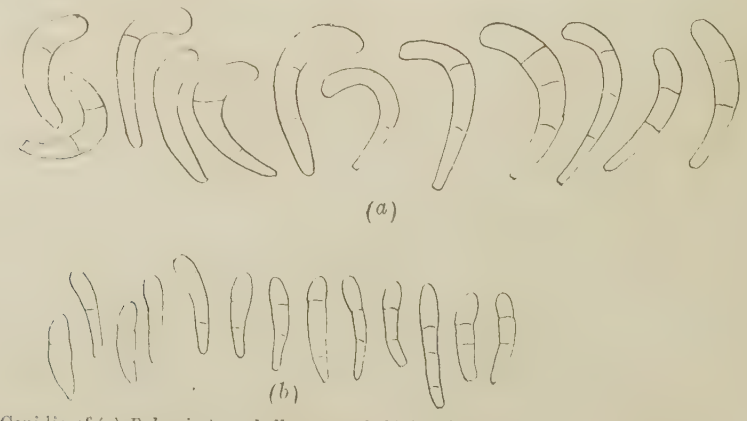


Fig. 8.—Conidia of (a) *Bulgariastrum bullatum*, and (b) *B. africanum*.

255. **Bulgariastrum bullatum** Doidge nov. spec.

Ascomata hypophylla et caulicola, in epiphyllo maculas rufo-brunneas usque 5 mm. latas leniter depressas efformantia, dense caespitosa et greges orbiculares 4–5 mm. latos vel confluendo irregulares formantia, in stromata pulvinata erumpenti superficialia oriunda, subsessilia v. basi brevissime stipitiformi contracta, subturbinata, glabra, gelatinea, in sicco cornea, atra, disco leniter concavo dilute brunneo, 500–800 μ lato ; contextu parenchymatico ex cellulis rotundatis 10–15 μ diam. composito. Asci clavati, apice rotundati, basi pedicellati, 65–100 μ longi, 12–14 μ lati, octospori. Paraphyses filiformae, sursum clavato incrassatae (2·5–4 μ) et epithecium densum flavo-fuscidulum formantes. Sporae oblique monostichae v. subdistichae, clavato-ellipsoideae, 1-septatae, leniter constrictae, hyalinae, 12·5–17·5 × 5–7 μ (vix maturae) cellulae superiore plerumque late rotundata et crassiore.

Status conidiiferus *Oncospora bullata* Kalchbr. et Cooke.

Hab. in foliis *Capparidis citrifoliae*, Langholm Estates, Bathurst, leg. Doidge, 12350.

Stromata amphigenous and caulicolous, but chiefly hypophyllous ; usually crowded on leaf spots, which are up to 5 mm. diam., scattered, or numerous and becoming confluent ; most conspicuous on the upper surface, where they are reddish-brown and concave. Conidiiferous stromata in close groups on leaf spots, round to ellipsoid, pulvinate, sometimes confluent and irregular, surface rough, dull black, often with irregular folds and cracks ; a few stromata often form on the upper leaf surface, opposite the densely grouped stromata on the lower surface. (Plate II.)

Ascomata closely grouped on similar leaf spots, often interspersed with the conidiiferous stromata, or at least covering the centre of the spot with a border of the latter ; under a low magnification, the disk is waxy in appearance with a raised, blackish-brown border.

The mycelium of the fungus in the epidermal cells of the host, sends out hyphae which penetrate more deeply into the leaf tissues ; these hyphae are at first parallel, 4–6 μ thick, thin-walled, with cells 10–15 μ long ; later becoming more closely septate and forming plates of angular cells 4–10 μ diam. ; these are most conspicuous between the cells of the host near the lower leaf surface, but penetrate right through the leaf and produce similar plates of cells between the palisade cells on the upper side.

Under a stoma, the hyphae grow rapidly, forming a compact, stromatic mass of cells near the surface, which become thicker-walled, and are at first hyaline, then brown and sub-opaque ; the epidermis is ruptured and the stroma continues to develop externally.

The conidiiferous stroma is pulvinate, 450–750 μ diam., 200–350 μ high, and the torn epidermis adheres closely to the sides of the stroma. The mature stroma consists of a blackish-brown, sub-opaque base, 150–250 μ diam., immersed in the outer cell layers of the leaf, expanding somewhat upwards and consisting of more or less parallel rows of cells 2–5 μ thick and 5–10 μ long, snuff-brown to pale fuscous in colour, pellucid, with a rough uneven cortical layer of darker irregular cells, loosely connected at the surface, globose, ellipsoid or polygonal in form and mostly 10–15 μ diam. The conidiiferous layer is formed within this cortex, which is 40–50 μ thick, and which ruptures and disappears as the conidia develop. Conidiophores forming a continuous layer, simple, straight, parallel, 10–15 μ long, 2–4 μ thick. Conidia dark olive-buff in mass, singly sub-hyaline, clavate, hamate to falcate, rarely almost straight, 20–35 μ long, 4–5 μ thick at the broadest point, which is about one-third of the distance from apex to base ; not tapering or tapering slightly to the rounded apex, attenuated gradually to the truncate base, which is 2–2·5 μ thick.

Ascomata formed on a pulvinate stroma similar to that in which the conidia are produced ; it usually develops from one-half of the stroma, the other half remaining sterile or producing a second ascoma or conidia. From a base 250–350 μ diam., the ascoma broadens rapidly, forming an expanded disk, 500–800 μ diam., slightly concave, rarely almost flat. Asci clavate, rounded at the apex, tapering gradually to the pedicellate base, 8-spored, sp. part 60–90 μ long, 12–14 μ broad, rather thin-walled, slightly thickened (2·5–4 μ) at the apex. Paraphyses filiform, clavate and ca. 4 μ thick at the apex, exceeding the asci and forming a dense, dark olive epithecium. Spores obliquely monostichous or

incompletely distichous, clavate-ellipsoid, 1-septate, very slightly constricted, 12·5–17·5 × 5–7 μ, broadly rounded above, tapering gradually to the rounded base, upper cells rather shorter and broader than the lower. The spores examiued were barely mature.

on *Capparis citrifolia* Lam., Langholm Estates, Bathurst, *Doidge*, 12350.

The conidial stage, *Oncospora bullata* Kalchbr. and Cooke [Grevillea IX (1880) p. 19] occurs very commonly near the south and south-east coast. The following collections have been examined :—

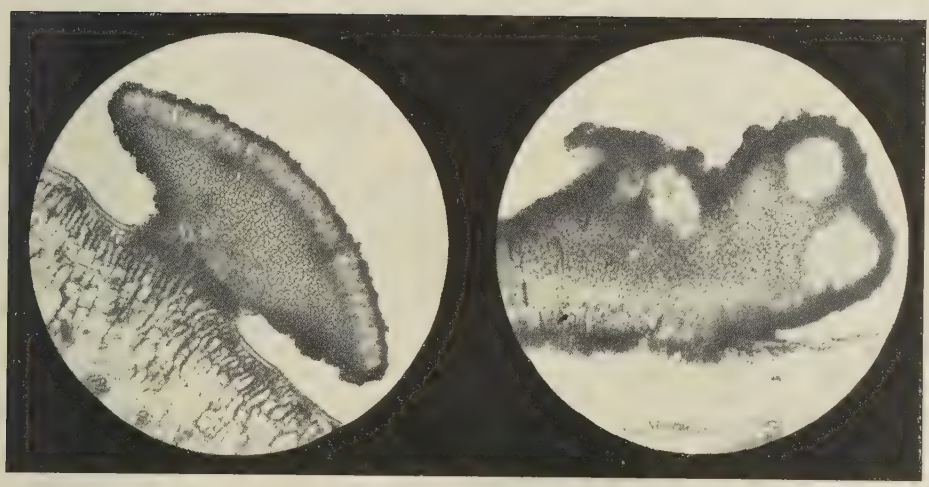
on *Capparis citrifolia* Lam., Kowie, *Stent*, 7789 ; Alexandria, *Doidge*, 22346 ; Knysna Heads, *Schonland*, 12512 ; Knysna, *Bottomley*, 32260, 32241 ; The Wilderness, *Doidge*, 17122 ; Bonza Bay, East London, *Bottomley*, 28680 ; Kingwilliamstown, *Weale* (ex Herb. MacOwan) 20806 ; Port Alfred, *Wager*, 28827 ; Grahamstown, *Hansford*, 33476 ; Kusaga Riv., *Archibald*, 33522 ; Bushmans River Mouth, *Archibald*, 33521.

Capparis Flanagani Gilg. and Ben., Boschberg, *MacOwan 1273*, 20982 ; Bushmans River, *Archibald*, 33523.

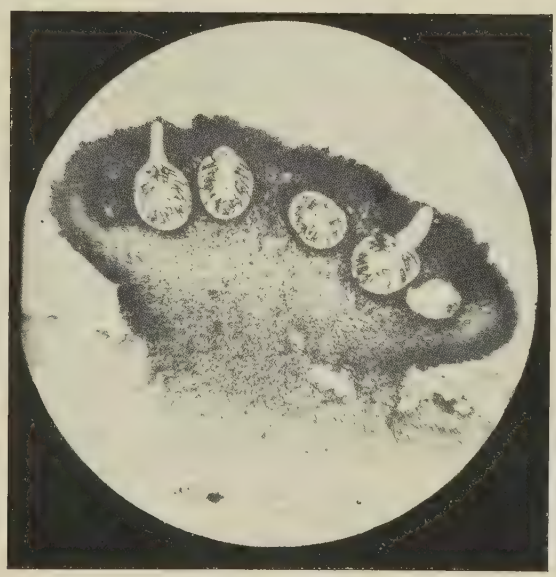
Capparis Gueinzii Sond., Uitenhage, *Pienaar*, 2362.

MacOwan 23, the type collection of *Oncospora bullata* is on *Capparis citrifolia* ; his second collection, *MacOwan 1273* was said to be on *Capparis Gueinzii*, but the portion of this collection in the Pretoria Herbarium appears to be on *C. Flanagani*, which was formerly included in *C. Gueinzii*.

The genus *Bulgariastrum* as at present known, comprises three species, all on leaves of *Capparis* spp. *B. bullatum* is closely related to *B. africanum* but appears to be quite distinct; the blue-green colour of the latter species is distinctive, and the conidial forms are more widely divergent than the ascomata. The type species, *B. caespitosum* Syd., occurs on *C. sepiaria* in the Philippines ; the conidial form is *Oncospora caespitosa* v. Hohn. Ex description, the latter species approaches *B. bullatum*, but there are numerous minor differences, and no specimen of the Philippine fungus has been available for comparison.

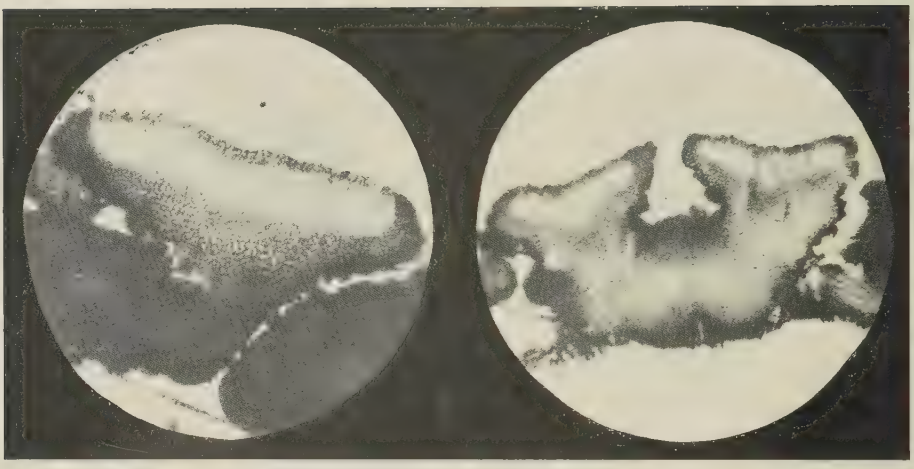


(*a*) (*b*)

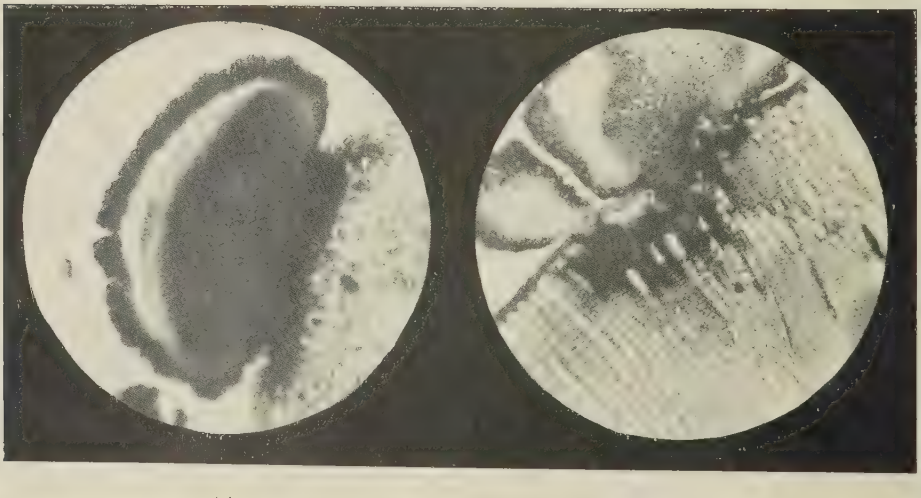


(*c*)

Plate I.—(a) Ascoma, and (b) condiiferous stroma of *Bulgariastrum africanum*; (c) stroma of *Valsaria Eucalypti* on Citrus. (Photo. H. A. V. King.)



(*a*) (*b*)



(*c*) (*d*)

Plate II.—(a and b) Ascomata of *Bulgariastrum bullatum* ; (c) Conidiiferous stroma ; (d) Section through the foot of stroma and leaf, showing the mycelium in the tissues. (Photo. H. A. V. King.)

CERCOSPORA SPECIES RECORDED FROM SOUTHERN AFRICA.

By Charles Chupp and Ethel M. Doidge.

Published records of the genus *Cercospora* in Southern Africa consist of a small number of descriptions of species on indigenous plants and scattered references, in lists of plant diseases, to species on plants in cultivation. Judging from specimens in the Cryptogamic Herbarium, Pretoria, the latter have not always been identified correctly. In the following pages 25 species on cultivated plants are listed; these are mostly cosmopolitan, or at least occur commonly in tropical and subtropical countries; several are recorded for the first time from Southern Africa.

No systematic collections have been made of fungi causing leaf spots on indigenous plants. Seven species of *Cercospora* were described by Kalchbrenner, Cooke and Winter from material collected by MacOwan and Medley Wood; in later years, H. and P. Sydow described 10 species and *Cercospora Oliniae* was described by Verwoerd and Dippenaar. A considerable quantity of material in the Pretoria Herbarium had not been studied; unfortunately much of this is in poor condition and could not be identified, but an examination of leaves with lesions on which acervuli of *Cercospora* have developed has revealed a number of unrecorded species. It has been deemed advisable, therefore, to bring together all records of *Cercospora* spp. known to occur in Southern Africa.

In the following pages 75 species are listed; 25 occur on cultivated plants and the remainder on plants indigenous to South Africa; of the latter 18 were previously recorded from South Africa, 21 are species known in other parts of the world and 10 are described as new. The species are arranged in alphabetical order.

Cercospora Apii Fresen.

Beiträge z. Mykol. 3 (1863), p. 91, Taf. XI, Figs. 46–54.

on *Apium graveolens* Linn. var. *dulce* D.C., Cedara, Natal, 2099.

Cercospora arachidicola Hori.

Ann. Rept. Nishigara Agric. Exp. Sta., Tokyo (1917), p. 26.

on *Arachis hypogaea* Linn., Gwebi and Salisbury, *Eyles 4987*, *5001* (Rh. 481, 836, 2122); Bindura, *Hopkins* (Rh. 1619); Marandellas, *Hopkins* (Rh. 1474).

Cercospora Argyrolobii Chupp et Doidge nov. spec.

Maculae amphigenae, per folium irregulariter dispersae, irregulares vel angulatae, sordide brunneae, minutae v. effusae, haud acute definitae. Caespituli amphigeni, plerumque epiphylli, minuti, laxe dispersi, atro-olivacei, in tomento denso folii absconditi. Hypostroma nullum v. minutum, sub epidermide innatum, irregulariter rotundatum, usque 40 μ diam., subhyalinum, contextu molliusculo indistincte parenchymatico. Conidiophora per stomata folii emergentia, haud vel plus minus fasciculata, pallide v. modice brunnea, ad apicem pallidiora, crassitudine irregularia, distincte creboque septata, saepe ad septa constricta, varie curvata v. tortuosa, raro geniculata, ramosa, 20–100 μ longa, 4–6·5 μ crassa, cicatrice conidii minuta ad apicem obtuse rotundatum v. conicum praedita. Conidia pallide v. modice olivacco-brunnea, obclavata v. obclavato-cylindracea, breviora interdum cylindracea, recta v. leniter curvata, distincte 3–13-septata, interdum ad septa constricta, basi subtruncata vel ad basim obconice truncatam sensim attenuata, apice plerumque obtusa, 15–110 μ longa, 4–6·5 μ crassa.

Hab. in foliis *Argyrolobii Wilmsii* Harms, Nelspruit, leg. L. C. C. Liebenberg, 26075.

Cercospora Bauhiniae H. and P. Syd.

Ann. Myc. 12 (1914), p. 202.

Cercospora latimaculans Wakefield, Kew Bull. 1918, p. 210.

on *Bauhinia Galpini* N.E. Br., leaves, Tzaneen, *Liebenberg*, 32734 ; Nelspruit, *Liebenberg*, 26075 ; Schagen. *Liebenberg*, 32879.

Cercospora beticola Sacc.

Nuovo Giorn. Bot. Ital. 8 (1876), p. 189.

Cercospora flagelliformis Ell. et Halsted, N. Jersey Ann. Rept. for 1890 (1891), p. 355.

Cercospora Spinaciae Oud., Nederl. Kruidk. Arch. III, 2 (1900), 314.

Cercosporina spinacicola Sacc., Nuov. Giorn. Bot. Ital. N.S. 22 (1915), 73.

on *Beta vulgaris* L., leaves, Pretoria, 661, and *Naudé*, 27574 ; Pyramids, *Bottomley*, 30933 ; Potchefstroom, 23494 ; Schagen. *Liebenberg*, 26180 ; Kentani, *Pegler 2389*, 9429 ; Natal, without locality, 1078 ; Cedara, *Staples*, 15430 ; Maritzburg, *Erxleben*, 17006, 17008 ; Thornville Junction, *Slatter*, 23180 ; Bloemfontein, *Verwoerd* ; Stellenbosch, *van der Byl 1159* ; Stellenbosch, Kuilsrivier, Wynberg, Dieprivier, Paarl and Wellington, *Verwoerd* ; Avondale (Rh. 711) ; Salisbury (Rh. 1742).

Beta vulgaris L. var. *Cicla* L., Pretoria, *Wager*, 23218 and *Naudé*, 27574.

Cercospora Byliana H. Syd.

Ann. Myc. 22 (1924) 433.

on *Allamanda cathartica* L., leaves, Tzaneen, *van der Byl 1508*, Co-type, 34277.

Cercospora caffra H. et P. Sydow.

Ann. Myc. 12 (1914), 267.

on *Sclerocarya caffra* Sond., leaves, Nelspruit, *Hall*, 6618, Co-type ; Schagen, *Liebenberg*, 26353.

Cercospora canescens Ell. et Mart.

American Naturalist 16 (1882), 1001.

on *Dolichos biflorus* L., leaves, Salisbury (Rh. 2143).

Dolichos sp., Nelspruit, *Liebenberg*, 26070.

Phaseolus vulgaris L., Salisbury, *Eyles 4999* (Rh. 1798, 1987).

Rhodesian records fide Hopkins in Proc. Rhod. Sc. Ass. 35 (1938), 122. The numbers in parentheses, with the letters Rh., are those of the Mycological Herbarium of the Department of Agriculture, Salisbury, Southern Rhodesia.

Cercospora Caryae Chupp et Doidge nov. spec.

Maculae amphigenae, per folium plus minus dense dispersae, irregulares, primitus minutae, 0·5-2 mm. diam., mox confluentes, plus minus effusae et saepe magnam folii partem occupantes, sordide brunneae, in epiphyllo tandem centro albicantes, saepe venulis foliii imitatae. Caespituli epiphylli, minuti, densi, laxe v. densiuscule dispersi, vix perpicusl, atro-olivacei. Hypostroma innato-erumpens, obscure v. olivaceo-brunneum, irregulariter rotundatum, 15-60 μ diam., laxe e cellulis rotundato-angulosis plerumque sat distinctis, 4-5 μ diam., metientibus compositum. Conidiophora dense caespitosa, simplicia,

haud geniculata, subrecta, 15–80 μ longa, 1–4-septata, saepe ad septa constricta, basi pallide brunnea, 4–6 μ lata, interdum usque 8 μ, apice obtuse rotundata pallidiora v. subhyalina. Conidia hyalina v. subhyalina, acicularia v. obclavata, recta v. lenissime curvata, pluriseptata, 20–75 μ longa, basi truncata v. subtruncata, 2·5–4 μ crassa, sursum ad apicem subacutum sensim attenuata.

Hab. in foliis *Caryae Pecan* Aschers. et Graebn., Alkmaar, 25441 Type: Plaston, leg. Wager, 28264.

Cercospora Cassinopsidis Wint.

Hedwigia 24 (1885), 34.

on *Cassinopsis capensis* Sond., Somerset West, *MacOwan*.

Type specimen not seen.

Cercospora circumscissa Sacc.

Fungi veneti novi vel critici, Ser. V. in Nuovo Giorn. Bot. Ital. VIII (1876), 189; Fung. Ital. autographice delineati, Fig. 659 (1881).

on *Prunus avium* L., leaves, Kingwilliamstown, *Dreyer*, 1187.

Cercospora Clerodendri Miyake.

Bot. Mag. Tokyo 27 (1913) 53, Tab. i, Figs. 20–21.

on *Clerodendron myricoids* R. Br. var. *cuneatum*, Nelspruit, *Liebenberg*, 26012.

The type of this species was not obtainable, so that the diagnosis is not absolutely certain; the fungus is distinct from *C. Bakeri* Syd. and from *C. Kashotoensis* Yam.

Cercospora Cluytiae Kalchbr. et Cooke.

Grevillea 9 (1880), 24.

on *Cluytia pulchella* L., leaves, Somerset East, *MacOwan 1352*, Kew, Type.

Cercospora coffeicola Berk. et Cooke.

Grevillea 9 (1881), 99.

Cercospora Coffeae Zimm., Ber. Land. u. Forstwirtsch. in Deutsch-Ostafrika (1904) 35

Cercospora Herrerana Farneti, Atti Ist. Bot. di Pavia 9 (1904), 13.

on *Coffea* sp., leaves, Nelspruit, *Liebenberg*, 26022; Concession (Rh. 907); Umtali (Rh. 912, 2735, 2946).

Cercospora columnaris Ell. et Everh.

Proc. Acad. Nat. Sci. Phil. (1894), Pt. III, p. 380.

Isariopsis griseola Sacc., Michelia 1 (1878), 273.

Cercospora Stuhlmanni P. Henn., Engl. Bot. Jahrb. 28 (1904), 40.

on *Phaseolus vulgaris* L., Pretoria, *Doidge*, 11387; Barberton, *Watts*, 15; Winkle Spruit, *Doidge*, 2504; Southern Rhodesia, *Hopkins*.

Cercospora Commelynae Kalchbr. et Cooke.

Grevillea 9 (1880) 24.

on *Commelina benghalensis* Linn., Somerset East, *MacOwan 1346*, Kew, Type.

Commelina sp., Stella Bush, Durban, *Marriott*, 32777.

Cercospora Corchori Sawada.

Agric. Exp. Sta., Formosa 1 (Special Bull. 19) (1919) 37, 667.

on *Corchorus tridens* Linn., Nelspruit, *Liebenberg*, 26001, 26309.

Cercospora Corchori has hyaline, acicular conidia. In the other species of *Cercospora* on this host genus conidia are coloured, not acicular.

Cercospora cruenta Sacc.

Michelia 2 (1880), 149.

on *Phaseolus vulgaris* Linn., Cedara, *Staples*, 15428; Potchefstroom, 23497; Southern Rhodesia, *Hopkins*.

Cercospora Curtisiae Chupp et Doidge nov. spec.

Maculae amphigenae, distinctissimae, irregulariter sparsae, suborbiculares v. irregulares, saepe angulatae, 2–4 mm. diam., obscure castaneo- v. purpureo-brunneae, saepe venulis folii limitatae, nonnunquam zonula rufo-brunnea circumdatae. Caespituli semper hypophylli. Conidiophora interdum dense fasciculata, in hypostromate rotundato obscure brunneo v. fere atro, 20–60 μ diam., indistincte parenchymatico orta, plerumque solitaria in hyphis ramosis procumbentibus oriunda, subhyalina v. pallide olivacea, continua, 15–70 μ longa, 2·5–4 μ crassa, raro septata v. geniculata, apice obtuse rotundata, haud attenuata, cicatricibus apicalibus conidiorum minutis. Conidia subhyalina v. pallide olivacea, obclavato-cylindracea, recta v. leniter curvata, obscure pluriseptata, basi obconice truncata, apice conica v. obtusa, 20–75 μ longa, 2·5–4 μ crassa.

Hab. in foliis *Curtisiae fagineae* Ait., Knysna, leg. Reinecke, 32077.

Cercospora delicatissima Kalchbr. et Cooke.

Grevillea 9 (1880), 24.

Asteroma pullum Kalchbr. in von Thümen, Flora 59 (1875), 380.

on *Priva Meyeri* Jaub. et Spach. (= *Priva dentata* Juss.) Boschberg, *MacOwan 1109*, 22013, Kew.

The spores of this species are hyaline, as shown by the type at Kew and the co-type at Berlin and Pretoria; it must therefore be transferred to the genus *Cercosporella* as **Cercosporella delicatissima** (Kalchbr. et Cooke) Chupp nov. comb.

Cercospora Demetrionana Wint.

Hedwigia 23 (1884) 170.

on *Crotalaria intermedia* Kl., Nelspruit, *Liebenberg*, 25970.
Crotalaria juncea Linn., Nelspruit, *Liebenberg*, 26676.

Cercospora Dissotidis Chupp et Doidge nov. spec.

Caespituli semper hypophylli, sine maculis sed decolorationes griseolas v. brunneolas indeterminatas interdum efficientes, plerumque dense aggregati et greges irregulariter angulatos, 2–10 mm. longos formantes, olivacei v. olivaceo-brunnei, inter pilos stellatos folii absconditi. Hypostroma nullum. Conidiophora plerumque haud fasciculata, solitaria, in hyphis ramosis, procumbentibus oriunda, 10–70 μ longa, crassitudine irregularia, 4–6 μ crassa, pallide olivacea v. fuliginea, parce septata, raro geniculata, apice obtuse rotundata, cicatrice unica conidii apicali parvula praedita. Conidia pallide v. pallidissime fuliginea, cylindracea, recta v. leniter curvata, 1–5-plerumque 3-septata, basi sensim obconice attenuata, apice obtusa, 20–55 μ longa, 4·5–6 μ crassa.

Hab. in foliis *Dissotidis incanae* Triana, Tweedie, Natal, leg. A. O. D. Mogg, 11651.

Cercospora Dovyalidis Chupp et Doidge nov. spec.

Maculae amphigenae, distinctissimae, irregulariter sparsae, primitus orbiculares v. ellipticae, dein interdum irregulares, 5–12 mm. diam., subacute definitae, distincte zonatae, zonulis irregulariter concentricis brunneolo-griseis usque atro-brunneis, in hypophyllo haud raro linea elevata limitatis. Caespituli amphigeni, densi v. densissimi, in hypophyllo magis evoluti, per maculas irregulariter dispersi. Hypostroma in et sub epidermide innatum, breviter cylindraceum, 15–60 μ diam., erumpens, parenchymatice e cellulis angulatis, 2·5–5 μ crassis. 5–7·5 μ longis, pallide olivaceo-brunneis compositum. Conidia in cellulis superioribus hypostromatum leniter elongatis, 12–15 μ vel usque 30 μ longis, basi pallide olivaceo-brunneis ca. 4 μ crassis, sursum leniter attenuatis et pallidioribus, simplicibus, rectis, haud septatis, cicatricibus indistinctis oriunda. Conidia subhyalina v. pallide olivacea, filiformi-cylindracea, recta, curvata v. undulata, mox non, mox apicem conice acutum versus lenissime attenuata, pluriseptata, haud constricta, ad basim truncatam v. subtruncatam non v. sensim obconice attenuata, 35–95 μ longa, 2·5–4 μ crassa.

Hab. in foliis *Dovyalidis Zeyheri* Warb., prope Pretoria, leg. Doidge, 7398.

Cercospora egenula (H. Syd.) Chupp et Doidge nov. comb.

Cercoseptoria egenula H. Sydow, Ann. Myc. 33 (1935), 235.

on *Solanum panduraeforme* E. Mey., Nelspruit, *Liebenberg*, 25999, Co-type.

The genus *Cercoseptoria* is based on " dense fascicles of very short conidiophores " or almost sessile conidia. The length of the conidiophore is such a relative thing that fully half of the proposed species might be doubtful. Consequently all *Cercoseptoria* species with coloured conidiophores are considered by the senior author (C. Chupp) as being *Cercospora* spp.

Cercospora Faureae Chupp et Doidge nov. spec.

Maculae suborbiculares, 2–8 mm. diam., fusco-cinerascentes, linea purpurea usque brunnea cinctae, nonnunquam zonatae. Caespituli epiphylli, minuti, atri, perspicui, oculo nudo visibiles. Stromata prominentia, globulosa, atra, 50–200 μ diam. Conidiophora densissime fasciculata medie usque obscure olivaceo-brunnea, colore aequalia, crassitudine irregularia, parce septata, simplicia, haud geniculata, varie curvata v. flexa, apice obtuse rotundata, 10–45 μ longa 3·5–5 μ crassa. Conidia pallidissime olivacea, cylindracea, recta v. subrecta, 3–5-septata, basi obconice truncata, apice obtusa, 20–50 μ longa, 3–5 μ crassa.

Hab. in foliis *Faureae speciosae*, Concession, S. Rhodesia, leg. J. C. Hopkins (Rh. 1620).

The prominent stromata and very dense fascicles resemble somewhat *Cercospora Protearum* Cooke, but in Cooke's species the conidia are medium dark olivaceous and measure 30–65 × 6–8 μ. The two fungi differ also in other characteristics.

Cercospora Fici Heald et Wolf.

Mycologia 3 (1911), 16.

? *Cercospora Fici-Caricae* Sawada, Dept. Agr. Res. Inst. Formosa 11 (1922), 151.

Cercospora ficicola v. Bond-Mont., Acta Inst. Bot. Acad. Sci. URSS. II, 3 (1936), 755.

on *Ficus Sycomorus* L., Nelspruit, *Liebenberg*, 26345.

This collection has shorter conidia than the type, but in other respects resembles it.

Cercospora fukushiana (Matsuura) Yam.

Journ. Plant Protection 14 (1927), 699.

Cercosporina fukushiana Matsuura, Trans. Tattori Soc. Agr. Sci. Japan 1 (–1928), 83.

on *Impatiens balsamina* Linn., Salisbury, S. Rhodesia, *Hopkins* (Rh. 4472), 34273.

Cercospora fusimaculans Atk.

Journ. Elisha Mitchell Sc. Soc. 8, Pt. 2 (1892), 18.

Cercospora Panici Davis, Trans. Wisc. Acad. Sci. 19 (1919), Pt. 2, p. 714.

? *Cercospora Panici-miliacei* Sawada, Descriptive catalogue Formosan Fungi V, Dept. Agr. Res. Inst., Formosa, Rept. 51 (1931), 131.

on *Brachiaria serrata* Stapf, Kaalfontein, *Pole Evans*, 10081.

Cercospora grandissima Rang.

Bol. Agric., Sao Paulo (1915), 322.

on *Dahlia pinnata* Cav., Salisbury, S. Rhodesia, *Hopkins*, (Rh. 507) 34259.

Cercospora guliana Sacc.

Ann. Myc. 11 (1913), 565.

Cercospora Amygdali Riza, Bull. Soc. Myc. Fr. 36 (1920) 191.

on *Prunus communis* Fritsch, Klerksdorp, 779; without locality, *Thomsen*, 1177; Louwscreek, *Bradbury*, 24891; Kirkwood, *Knights-Rayson*, 26634.

Cercospora Haemanthi Kalchbr.

Grevillea 9 (1880), 24.

on *Haemanthus magnificus* Herb., Pretoria, *Pole Evans*, 1203; Garstfontein, Pretoria district, *Doidge*, 1378; Buffelspoort, Marikana, *Doidge*, 28615.

Haemanthus natalensis Pappe, Maritzburg, *Doidge*, 867.

Haemanthus puniceus Linn., Boschberg, *MacOwan 1020*, Type (Herb. S. Afr. Mus. 35105); Natal, *Medley Wood*; Kentani, *Pegler 2406*, *2398*, 9772, 9738.

Cercospora Halleriae Chupp et Doidge nov. spec.

Maculae per folium irregulariter dispersae, plerumque irregulares et plus minus angulatae, 2–5 mm. diam., venulis folii limitatae, in epiphyllo acute definitae, obscure rufo- v. purpureo-brunneae, in hypophyllo indistinctae, v. plus minus brunneolae. Caespituli hypophylli, minuti, vix perspicui. Conidiophora ca. 2–15 fasciculatim ad basim substromatice conjuncta, per stomata emergentia, pallide v. pallidissime olivaceo-brunnea plerumque simplicia, raro ramosa, parce septata, recta v. plus minus tortuosa, haud geniculata, apice conica, cicatrice conidii apicali minuta praedita, 10–35 μ longa, 2–4 μ crassa. Conidia obclavata, subhyalina, recta v. leniter curvata, obscure septata, basi rotundata v. obconice truncata, apice conice acuta, 15–70 μ longa, 1·5–3 μ crassa.

Hab. in foliis *Halleriae lucidae* Linn., Barberton, leg. P. A. van der Byl, 7377.

Cercospora heteromalla H. Syd.

Ann. Myc. 22 (1924), 433.

on *Rubus rosaefolius* Sm., Woodbush, *van der Byl 1533*, Co-type.

Cercospora insulana (Sacc.) Chupp nov. comb.

Cercosporina insulana Sacc. Nuovo Giorn. Bot. Ital. N.S. 22 (1915), 74.

Cercospora Staticis Lobik, Bolezni Rast. (Morbi Plantarum) 17 (1928), 195.

on *Limonium sinuatum* Mill., Pretoria, *Wager*, 21247.

Cercospora Jussieuae Atk.

Journ. Elisha Mitch. Sc. Soc. 8, Pt. 2 (1892) 18.

Cercospora Jussieuae-repentis Sawada, Descriptive Catalogue of the Formosan Fungi IV, Dept. Agr. Res. Inst. Formosa, Rept. 35 (1988), 108.

on *Jussieua suffruticosa* L. var. *angustifolia* Lam., Nelspruit, *Liebenberg*, 26315.

Cercospora Kiggelariae H. Syd.

Ann. Myc. 22 (1924) 434.

on *Kiggelaria africana* Linn., Stellenbosch, *Brain* (van der Byl 1449) co-type ; Stellenbosch, *Verwoerd* (van der Byl 2677) ; Schagen, *Liebenberg*, 26315.

Cercospora Leoni Savul et Rayss.

Revue Path. Veg. and Entom. Agric. 22 (1935) 222.

on *Vitis vinifera* Linn. (sultana) Upington, *Hugo*, 33155 ; Marchand, Kakamas, *Valentin*, 33898 ; Upington, *du Plessis* (Stell. 1045, 1046).

Mr. E. W. Mason of the Imperial Mycological Institute examined No. 33155 and wrote : " I think that No. 33155 can be included in this species (*Cercospora Leoni*). The diagnosis gives the spores as 0–, then 1–2–, rarely 3-septate, 18–40 × 6·5–7 μ. The South African material is usually 1-septate, rarely 2-septate, 14–25 × 5·5–8 μ. Cercospora now includes species with free conidiophores, sporodochia, synnemata like this specimen, and acervuli. I think it is best to conform to this current opinion."

Five species of *Cercospora* have been described on *Vitis vinifera* which are identical or nearly related :—

Cercospora vitiphylla (Speschnew) Barbarine (reference not found).

Cercospora Roesleri (Cattan.) Saccardo, Michelia 2 (1880), 128.

Cercospora Leoni Savul et Rayss, l.c.

Cercospora coryneoides Savul et Rayss, l.c.

Cercospora Fuckelii Jacz (citation not known).

All of these resemble closely the fungus named *Septosporium heterosporum* by Ellis and Galloway. They also resemble species of *Coryneum* ; Speschnew (Fungi Transcapici et Turkestani) named his fungus *Coryneum vitiphyllum*. If this fungus on *Vitis vinifera* is to be regarded as a *Cercospora*, it could well be *Cercospora Leoni*, but the senior author (Ch. Chupp) is inclined to consider some other genus than *Cercospora* and would be willing to leave it under the name proposed by Ellis and Galloway.

Cercospora Leonotidis Cooke.

Grevillea 8 (1879), 72.

on *Leonotis leonitis* R. Br., Inanda, *Medley Wood 5*.

The portion of the collection *Medley Wood 5* in the Pretoria Herbarium, No. 10175, is *Puccinia Leucadis* on *Leucas martinicensis* ; it would appear that a mixed collection has been distributed under this number.

Cercospora Liebenbergii H. Syd.

Ann. Myc. 33 (1935) 235.

on *Rauwolfia caffra* Sond., Schagen, *Liebenberg*, 26177 Co-type, 30964.

Cercospora malayensis Stev. et Solh.

Mycologia 23 (1931), 394.

on *Hibiscus cannabinus* Linn., Schagen, *Liebenberg*, 26312; Nelspruit, *Liebenberg*, 26674; Salisbury, S. Rhodesia, *Hopkins* (Rh. 1233); Sinoia, *Hopkins* (Rh. 548); Shamva, *Hopkins* (Rh. 1252).

No. 26312 resembles the type more closely than does 26674, which has shorter, slightly narrower conidiophores and conidia than the type, but it may be a less mature specimen.

Cercospora melaena H. Syd.

Ann. Myc. 22 (1924), 434.

on *Flemingia Grahamiana* W. and A., Woodbush, *van der Byl 1522*, Co-type, and *Doidge*, 32911.

Cercospora melanochaeta Ell. et Everh.

Proc. Acad. Nat. Sci. Phil. (1894), 380.

on *Gymnosporia buxifolia* Szysz., Verulam, *van der Byl*, 6946; Kentani, *Pegler 2405*, 9771; Schagen, *Liebenberg*, 26350; Escombe, *Hean*, 33214.

Cercospora Momordicae McRae.

Ann. Crypt. Exot. 2 (1929), 267.

Cercospora Chardoniana Chupp, Monographs Univ. Porto Rico 2 (1934), 245.

Cercospora Momordicae Mendoza, Philippine Journ. Sci. 75 (1941), 173.

on *Momordica foetida* Schum. and Thom., Kentani, *Pegler 2453*, 11679.

Cercospora Musae Zimmermann.

Centralbl. f. Bakt. II, 8 (1902), 219.

Cercospora Musae Massee, Kew Bull. (1914), 159.

on *Musa* sp., Gondola, Moçambique (Rh. 5766), 34275.

Cercospora myrticola Speg.

Ann. Soc. Cientif. Argent. 17 (1884), 167.

Cercospora Myrti Eriks., Bidr. till. Käned. Odl. Växt. Szukdomar. Stockholm (1885), 79. [See also Trans. Brit. Myc. Soc. 6 (1919), 157.]

on *Myrtus communis* Linn., Blauwvlei, Wellington, *Doidge*, 2066; Hopefield *van der Byl 1327*.

Cercospora Nicotianae Ell. et Everh.

Proc. Acad. Nat. Sci. Phil. (1893), 170.

on *Nicotiana Tabacum* Linn., Swaziland, *Gray*, 894; Zomba, Nyasaland, det. Mason; Salisbury, Southern Rhodesia, *Hopkins* (Rh. 532, 1801, 1803, 3786); Eldorado, *Hopkins* (Rh. 1767); Trelawney, *Hopkins* (Rh. 3304).

Cercospora oblecta H. Syd.

Ann. Myc. 33 (1935), 235.

on *Annona senegalensis* Pers., Nelspruit, *Liebenberg*, 26403, Co-type.

Cercospora occidentalis Cooke.

Hedwigia 17 (1878), 39.

Cercospora personata (B. and C.) Ellis var. *occidentalis* Berk. et Cooke, Grevillea 3 (1874), 106.

Cercospora Paulensis P. Henn., Hedwigia 48 (1908), 18.

Cercospora somalensis Curszi, Bol. R. Staz. Patol. Veget. n.s. 12 (1932), 158.

Cercosporina occidentalis (Cooke) Sacc. Syll. Fung. 25 (1931), 1906.

Cladosporium personatum Berk. et Curt. var. Cassiae Thüm., Myc. Univ. No. 1964.

Ramularia cassiaecola Heald et Wolf, U.S. Dept. Agric. Bur. Plant Ind., Bull. 226 (1912), 101.

on *Cassia delagöensis* Harv., Nelspruit, *Liebenberg*, 26033; Schagen, *Liebenberg*, 26352, 32881.

Cercospora Oliniae Verw. et Dipp.

South Afric. Journ. Sci. 27 (1930), 326.

on *Olinia cymosa* Thunb., Stellenbosch, *Dippenaar* (van der Byl 2583), Co-type.

Cercospora omphacodes Ell. et Holw.

Journ. Myc. 1 (1885), 5.

Cercospora Phlogina Peck, New York State Mus. Bull. 150 (1911), 24.

on *Phlox Drummondi* Hk., Cramond, *Hill*, 6836.

Cercospora Pachycarpi Chupp et Doidge nov. spec.

Maculae amphigenae satis perspicuae, sordide brunneae, angulatae, primitus oblongae, 6–12 × 2·5–3 mm., venulis folii limitatae, deinde plus minus confluentes, irregulares et saepe magnam folii partem occupantes. Caespituli amphigeni, plerumque epiphylli, laxe dispersi, obscure olivacei, minuti. Hypostroma minutum vel usque 60 μ diam., in parte basali subepidermali e cellulis laxe parenchymaticis rotundato-angulatis, 5–7·5 μ diam., compositum: cellulae in superiore parte cylindrice per stoma emergentes, valde elongatae, pallidiores, ca. 2·5 μ crassae, in conidiophora treanseuntes. Conidiophora plus minus dense fasciculata, crassitudine irregularia, interdum clavata, pellucide olivaceo-brunnea, ad apicem haud pallidiora, recta v. tortuosa, parce sed distincte septata, raro geniculata, 10–35 μ longa, 5–7·5 μ crassa, cicatricibus conidiorum apicalibus v. subapicalibus, unicis v. pluribus in quoque conidiophoro praedita. Conidia pallide olivacea, obclavata, recta v. leniter curvata, obscure pluriseptata, basi obconice truntata, apice subobtusa, 40–130 μ longa, 4·5–6 μ crassa.

Hab. in foliis *Pachycarpi Schinziani* N.E. Br., Wonderboom prope Pretoria, leg. P. A. van der Byl, 2208.

Cercospora Pareirae Speg.

Ann. Mus. Nac. Buenos Aires 20 (1910), 440.

on *Cissampelos mucronata* A. Rich., Schagen, *Liebenberg*, 26314.

Cercospora Persicariae Yam.

Journ. Trop. Agric. Formosa 6 (1934), 605.

?on *Polygonum tomentosum* Willd., Nels Rivier nr. Nelspruit, *Liebenberg*, 26011.

This may be an undescribed species, but as the material is in poor condition and few spores present, it is impossible to be certain.

Cercospora personata (Berk. et Curt.) Ellis.

Journ. Myc. 1 (1885), 63.

on *Arachis hypogaea* Linn., Skinner's Court, 993, 1287 ; Hartebeestpoort Expt. Sta., *Sellschop*, 32136, 32137 ; Crecy, *Sellschop*, 30649 ; Nelspruit, *Liebenberg*, 26675 ; Immerpan, *Steen*, 25364 ; Barberton, *Parsons*, 25363 ; Northern Flats, *Dros*, 25924 ; Cedara, *Staples*, 17060 ; Maritzburg, *Erxleben*, 15447 ; Sao Paulo, Moçambique, *Howard*, 978.

Cercospora phaeocarpa Mitter.

Ann. Myc. 35 (1937), 239.

on *Bauhinia Thonningii* Schum., Concession, *Hopkins* (Rh. 1621), 34265.

This collection exactly resembles the type, which is on leaves of *Bauhinia* sp., Majhgawan, India. It has been agreed by the senior author (Ch. Chupp) and by Mr. E. W. Mason of the Imperial Mycological Institute, Kew, that all species with thick-walled conidia, especially if they are dark-coloured and closely septate, should be classed as *Helminthosporium*. *Cercospora phaeocarpa* should therefore be transferred to the genus *Helminthosporium* ; it is quite distinct from *C. Bauhiniae*.

Cercospora Pouzolziae H. Syd.

Ann. Myc. 33 (1935), 236.

on *Pouzolzia hypoleuca* Wedd., Nelspruit, *Liebenberg*, 26013, Co-type.

Cercospora pretoriensis Chupp et Doidge nov. spec.

Maculae amphigenae, irregulariter sparsae, suborbiculares, 2–6 mm. diam. saepe 2 vel 3 juxtapositae et plus minus confluentes, in epiphyllo distinctissimae centro pallide brunneae v. sordide griseae, zonula plus minus lata rubra v. rufo-brunnea circumdatae, in hypophyllo minus perspicuae zonula pallidiore. Caespituli epiphylli, per maculam dense v. irregulariter dispersi, punctiformes, non vel vix confluentes, atro-olivacei, singuli subinde tantum hypophylli. Hypostroma innatum, olivaceo-brunneum, irregulariter rotundatum, 15–60 μ diam., plus minus erumpens, contectu molliusculo, indistincte parenchymatico, e cellulis angulato-rotundatis ca. 4–5 μ diam. metientibus compositum. Conidiophora dense caespitosa, in fasciculis olivaceo-brunnea, singula pallide fuliginea, simplicia, septata, cylindracea, apicem obtuse rotundatum versus attenuata et pallidiora, plus minus curvata v. tortuosa, raro abrupte geniculata, 10–100 μ longa, 3–5 μ crassa. Conidia hyalina, anguste cylindracea v. subacicularia, recta v. leniter curvata, interdum subfalcata, pluriseptata, 30–90 μ longa, basi subtruncata, 2–4 μ lata, sursum haud vel sensim attenuata, apice subobtusa.

Hab. in foliis *Gomphrenae decumbentis* Jacq. var. *genuinae* Stuchlik, Arcadia, Pretoria, 6593 Type et 775 ; Skinner's Court, Pretoria, 1937 ; Donkerpoort, Pretoria district, leg. Doidge et Bottomley, 32789 ; Schagen, leg. Liebenberg, 26316.

Cercospora Protearum Cooke.

Grevillea 12 (1883), 39.

Cercospora Protearum var. *Leucospermi* Cooke, l.c.

Cercospora Protearum var. *Leucadendri* Cooke, l.c.

on *Leucospermum conocarpum* R. Br., Hottentot's Holland, *MacOwan 1456* (Ranenh, Fung. Eur. 3589) 3929, Kew ; St. James, *Pole Evans*, 5570 ; Stellenbosch. *Duthie* (van der Byl 62).

Leucadendron argenteum R. Br., Table Mt., Cape, *MacOwan 1457*, Kew ; Kirstenbosch, *Pearson*, 8354.

Cercospora psychotriaecola Chupp et Doidge nov. spec.

Maculae utrinque perspicuae, sparsae, plerumque foliorum marginibus occupantes, suborbiculares v. irregulares, saepe venulis folii limitatae et tunc angulosae, 3–8 mm. diam., castaneo-brunneae, interdum zonula plus minus lata pallide viridula circumdatae. Caespituli hypophylli, grisei v. olivacei, per totam maculam densiuscule dispersi. Hypostroma infra stomata subepidermide innatum, irregulariter rotundatum, 55–85 μ diam., erumpens, in parte basali parenchymatice e cellulis opace brunneis indistinctis composita, cellulae in superiore parte olivaceae, elongatae, 2·5–4 μ crassae, in conidiophora transeuntes. Conidiophora dense stipata, divergentia, dilute olivacea, apicem versus pallidiora, crassitudine aliquanto irregularia, parce septata, haud geniculata, simplicia, recta v. curvata, apice obtuse rotundata, 5–45 μ longa, 2–4 μ crassa. Conidia subhyalina v. dilute olivacea, anguste obclavata, apicem versus leniter attenuata, obscure pluriseptata, recta v. curvata, basi obconice-truncata, apice subacuta, 40–120 μ longa, 2–4 μ crassa.

Hab. in foliis *Psychotriae capensis* Vatke, in sylvis Mambatini prope Nelspruit, leg. A. O. D. Mogg, 32773.

Cercospora punctiformis Sacc. et Roum.

Rev. Myc. 3 (1881), 39.

Cercospora Vincetoxici Ell et Everh., Journ. Myc. 8 (1902), 73.

on *Cynanchum natalitium* Schlecht., Isipingo, *Doidge*, 6642.

This specimen resembles the original in every particular, except that the conidia are longer, 30–100 × 3–4 μ, as compared with 20–55 × 3–4 μ.

Cercospora Resedae Fuck.

Symb. Myc. (1869), 353.

on *Reseda odorata* Linn., Kentani, *Pegler 2390*, 9428, Kew ; Barberton, 439 ; Hopefield, *van der Byl 1272*.

Cercospora Rhoicissi H. et P. Sydow.

Ann. Myc. 10 (1912), 444.

on *Rhoicissus erythrodes* (Fres.) Planch., Barberton, *Lounsbury*, 1275, Co-type.

Cercospora riachueli Speg.

An. Soc. Cientif. Argent. 9 (1880), 38.

on *Cissus* sp., Schagen, *Liebenberg*, 26178.

This is like the type, except that the conidia are longer and do not average as wide. It is not like *Cercospora Cissi-japonicae* Hori, which has wider conidia and much longer conidiophores.

Cercospora richardiaecola Atk.

Journ. Elisha Mitchell Sc. Soc. 8, Pt. 2 (1892), 19.

on *Zantedeschia aethiopica* (L.) Spreng., Pretoria, *Bottomley*, 14269 ; Salisbury, S. Rhodesia (Rh. 1214).

Zantedeschia angustiloba (Schott.) Engl., Pretoria, *Bottomley*, 14271.

Zantedeschia Rehmanni Engl., Pretoria, *Bottomley*, 14270.

Zantedeschia sp., Maritzburg, *Schmutz*, 31198.

Cercospora ricinella Sacc. et Berk.

Atti R. Ist. Venito Sci., Lett. ed Arti, 6 ser., III (1885), 711.

on *Ricinus communis* Linn., Nelspruit, *Liebenberg*, 26010.

Cercospora rubro-tincta Ell. et Everh.

Journ. Myc. 3 (1887), 20.

Cercospora consobrina Ell. et Everh., Journ. Myc. 3 (1887), 19.

on *Prunus persica* Sieb. et Zucc., Potchefstroom, 23496.

Cercospora scitula H. Syd.

Ann. Myc. 33 (1935), 236.

on *Annona senegalensis* Pers., Nelspruit, *Liebenberg*, 26027.

Cercospora Sesami Zimm.

Ber. Land.—u. Forstwirtsch. Deutsch-Ostafrik. (1904), 28.

on *Ceratotheca triloba* E. Mey., Schagen, *Liebenberg*, 26179.

Pretrea zanguebarica J. Gay, Nelspruit, *Liebenberg*, 26048.

This fungus closely resembles the type, but cross inoculations should be made from *Sesamum* to *Ceratotheca* and *Pretrea*.

Cercospora Solani-melongenae Chupp.

Cercospora Solani-melongenae Hori nom. nud.

Maculae amphigenae, per folium irregulariter dispersae, subinde 2 vel 3 juxtapositae et plus minus confluentes, suborbiculares, rufo-brunneae, nonnunquam zonula indistincta obscuriori marginatae, centro demum arescentes. Caespituli amphigeni, laxe v. densiuscule dispersi, olivacei, minuti. Hypostroma in et sub epidermide innato-erumpens, irregulariter globosum, obscure brunneum, parenchymatice e cellulis roteundato-angulosis, ca. 3–5 μ diam. compositum. Conidiophora densissime, caespitosa, in fasciculo olivaceo-brunnea, singularia dilute olivacea, apicem versus pallidiora, crassitudine aequalia v. irregularia, continua v. parce septata, semper simplicia, haud geniculata, recta v. leniter curvata, apice obtusa v. conoidea, saepe brevissima, 5–30 μ longa, 3–5 μ crassa. Conidia subhyalina v. dilute olivacea, obclavato-cylindracea, recta v. lenissime curvata, 3–7-septata, basi subtruncata v. obconica, apice conica v. obtusa, 30–40 μ longa, 3–5 μ crassa.

Hab. in foliis *Solani melongenae*, Japan, leg. Hori.

Cercospora Solani-melongenae Hori is a nomen nudum, which was withdrawn by Hori in favour of *C. Melongenae* Welles. The particulars are given by Areta Ideta in the "Supplement to Handbook of the Plant Diseases of Japan II (1926), pp. 996–7." Welles' species has hyaline acicular conidia and in no way resembles Hori's collection, which was distributed to various herbaria. The above description is based on the portion of Hori's collection to be found at Washington, D.C. Hori's species is identical with the fungus collected on the Natal coast, which may now be named :—

Cercospora Solani-melongenae Chupp.

on *Solanum Melongena* L. var. *esculentum* Nees, Cavendish, Natal, *Wager*, 34107

Cercospora Sorghi Ell. et Everh.

Journ. Myc. 3 (1887), 15.

on *Cymbopogon atronardus* Stapf, Nelspruit, *Liebenberg*, 26061.

Cymbopogon excavatus Stapf, Wolwekloof, *Bottomley*, 29953 ; Schagen, *Liebenberg*, 32910.

The South African fungus resembles the type fairly closely, but the conidiophores and conidia are slightly smaller than in many collections.

Cercospora sphaeroidea Speg.

Anal. Soc. Cientif. Argentina 16 (1883), 169.

on *Cassia delagoensis* Harv., Umbelusi, Moçambique, *Howard*, 522.

Cercospora Stizolobii H. et P. Sydow.

Ann. Myc. 11 (1913), 270.

Cercospora Mucunae-ferrugineae Yamomoto, Trans. Sapporo Nat. Hist. Soc. 13 (1934), 141.

on *Stizolobium Deeringianum* Bort., Salisbury, Hopkins (Rh. 5302), 33969.

Cercospora transvaalensis H. Syd.

Ann. Myc. 33 (1935), 237.

on *Acalypha petiolaris* Hochst., Nelspruit, *Liebenberg*, 26002, Co-type.

Cercospora Tremae (Stev. et Solh.) Chupp nov. comb.

Ragnhildiana Tremae Stev. et Solh., Mycologia 23 (1931), 405.

on *Trema guineensis* (Schum.) Ficalho, Durban, *Doidge*, 1671.

Cercospora Violae Sacc.

Nuovo Giorn. Bot. Ital. 8 (1876), 187.

on *Viola odorata* Linn., Pretoria, *Faure*, 884, *Pole Evans*, 6678 and *Wager* 21580 ; Potchefstroom, 23495 ; Barberton, 440 ; Fort Hare, *Lyle*, 25422, Idutywa, *Imray*, 22343 ; Cramond, *Pole Evans*, 1497 ; Donnybrook, *Morgan*, 28610 ; Salisbury, *Eyles 2098*, 14015 ; Lourenço Marques, *Howard*, 951 ; Salisbury, *Hopkins* (Rh. 1314, 1602), Kew.

Viola tricolor Linn., Claremont, Cape, 741.

Cercospora Vitis (Lév.) Sacc.

Fung. Ital. aut. del., tab. 671 (1881).

Cercospora viticola (Ces.) Sacc., Syll. Fung. 4 (1886), 458, and many other synonyms.

on *Vitis vinifera* Linn., Pretoria, *Bottomley*, 32636 ; Vaalwater, Waterberg, *Farrant*, 30765 ; Buffelspoort, *Bottomley*, 32701, Middelburg, Tvl., 612 ; Kingwilliamstown, *Mally*, 462, 1182, 1173 ; Verulam, *James*, 33299 ; Eshowe, *Pole Evans*, 2025 ; Ezulweni, Swaziland, *Douglas*, 26378 ; Modder River, *Dreyer*, 283 ; Kentani, *Pegler*, 9740 ; Gwelo (Rh. 2048) ; Salisbury (Rh. 1535, 1988, 1820).

Cercospora Withaniae Syd.

Ann. Myc. 10 (1912), 444.

on *Withania somnifera* Dun., Bluff, Durban, *Doidge*, 1672, Co-type.

Cercospora Zizyphi Petch.

Ann. Roy. Bot. Gard. Peradinya 4, Pt. 5 (1909), 306.

on *Zizyphus mucronata* Willd., Barclayvale, *Liebenberg*, 32880 ; Schagen, *Liebenberg*, 26347, 32876 ; Tzaneen, *Liebenberg*, 32726.

SOUTH AFRICAN RUST FUNGI.

By E. M. Doidge.

Part V.

Aecidium Barleriae Doidge nov. spec.

Aecidia hypophylla, in epiphyllo decolorationes sat conspicuas indeterminatas brunneas efficientes, in greges plus minus orbiculares usque 3 mm. diam. metientes disposita, cupulata, 200–250 μ diam.; peridio diutius vesiculoso-clauso, tandem late aperto et cupulato, margine albido, erecto vel parum recurvato, integro v. irregulariter inciso; cellulis peridii firme conjunctis rhomboideis v. oblongis, 30–42 × 17·5–22·5 μ, pariete exteriore striato, 6–8 μ crasso, interiore dense verrucoso, 3–4 μ crasso. Aecidiosporae angulato-globosae vel oblongae, 22·5–30 × 17·5–20 μ, dense sed subtilissime verruculosae, membrana hyalina 1–1·5 μ crassa.

Hab. in foliis *Barleriae crassae* C.B.Cl, Concession, Rhodesia, leg. Hopkins (Rh. 3684), 33423.

The aecidia are on poorly defined leaf spots, which are at first purplish-brown on the upper side of the leaf; later they become light brown and dry in the centre immediately opposite the aecidia, but still retain a purplish-brown margin.

Aecidium benguellense Lager.

in Bol. da Soc. Brot. VII (1889) p. 134; Syd. Monogr. Ured. IV (1925) p. 89.

Spermogonia amphigenous, fairly numerous, in rather close groups, 80–120 μ diam., at first honey-yellow, then brown and finally black.

Aecidia hypophyllous, on reddish-brown leaf spots, in round groups 1–2 cm. diam., arranged in circles, cupulate, 200–300 μ diam. Margin of the peridium white, revolute, laciniate; cells of the peridium firmly united, imbricate, rhomboid or irregularly angular, 35–40 μ long, 20–25 μ broad, outer wall striate, 6–8 μ thick, inner verrucose, 4–6 μ thick. Spores angular globose, ellipsoid or oblong, closely and minutely verruculose, subhyaline, 23–28 × 17–23 μ; epispore 1 μ thick, always thicker at the apex (3–8 μ).

on leaves of *Temnocalyx obovatus* Robyns, Concession, *Hopkins* (Rh. 3682), 33424.

Aecidium benguellense was originally described on leaves of *Stephanostigma fuchsoides* Welw., from Lake Ivantâla, Huilla, where it was collected by Welwitsch. This plant is now known as *Temnocalyx fuchsoides* (Welw.) Robyns.

Aecidium Diospyri A. L. Sm.

in London Journ. of Bot. XXXVI (1898) p. 178; Syd. Monogr. Ured. IV (1924) p. 144.

Aecidium atro-album P. Hennings in Bot. Ergebnisse der Kunene-Sambesi Exped. (1903) p. 162.

Spermogonia epiphyllous, closely crowded, shiny black, 180–220 μ diam.

Aecidia on yellow or yellow-brown leaf spots, which become blackish-brown and finally pale or whity-brown in the centre with a blackish border. Aecidia hypophyllous in round groups 1–3 mm. diam., closely crowded, briefly cylindrical, ca. 200 μ diam.; the ruptured and blackened epidermis is persistent and surrounds the aecidium like a wall. Margin of the peridium white, revolute, denticulate; cells of the peridium firmly joined together; imbricate, pentagonal to hexagonal, 24–30 × 17–20 μ, the upper part densely verrucose,

outer wall 4-5 μ thick, inner 3–4 μ thick. Spores globose, subglobose, angular or ellipsoid, closely and minutely verruculose, subhyaline, 17–22 × 16–18 μ; epispore ca. 1 μ thick.

on leaves of *Diospyros mespiliformis* Hochst., Hippo Pool, Kruger National Park, *Liebenberg*, 32729.

The type was collected by Welwitsch in Angola on the same host; the same fungus, collected by Baum on the Kunene River, was described by Hennings (l.c.) under the name *Aecidium atro-album*.

Aecidium Dipcadi-viridis Doidge nov. spec.

Aecidia hypophylla in greges ellipticos v. subrotundatos 6–15 mm. longos dense congesta, circinatim disposita, profunde immersa, 150–220 μ diam; peridio diutius vesiculo-clauso, tandem cylindraceo, usque 500 μ longo, margine albo, leniter recurvato, inciso; cellulis peridii firme conjunctis, irregulariter polygonalibus, saepius quadriticis, imbricatis, 22·5–40 × 20–25 μ, pariete exteriore striato 7·5–10 μ crasso, interiore verrucoso, 4–5 μ crasso. Aecidiosporae angulato-globosae, ovatae v. oblongae, hyalinae v. subhyalinae, minute verruculosae, 21–26 × 17·5–20 μ, membrana ca. 1·5 μ crassa.

Hab. in foliis *Dipcadi viridis* Moench., Mamathes, Basutoland, leg. Hean, 33136.

This aecidium often causes some hypertrophy of the host tissues; it differs from *Aecidium Dipcadi* Har. and Fat., described on *Dipcadi nilellansis* from Central Africa.

Aecidium heliotropicolum Talbot nov. spec.

Aecidia foliicola, caulicola et calycicola, in foliis amphigena, cylindracea circa 1 mm. longa, 300–500 μ diam., albida v. pallide mellea, margine revoluto lacerato, in greges grandes inaequaliter disposita; cellulis peridii firme conjunctis, imbricatis, aut subglobosis aut quadraticis vel polygonis, 14–20 × 17–26 μ, pariete exteriore striato, ca. 4 μ crasso, interiore verrucoso et striato 1·5–2·8 μ. Aecidiosporae subhyalinae vel melleae, oblongae polygonales v. angulato-subglobosae, 11–15 × 17–23 μ; episporio dense minuteque verrucoloso, 1–1·5 μ crasso.

Hab. in foliis, caulibus et calycibus *Heliotropii Nelsoni*, in regione Potchefstroom, leg. W. J. Louw, 35016.

Aecidia on leaves, stems and calyces, amphigenous on leaves, cylindrical, up to 1 mm. long and 300–500 μ diameter, densely aggregated in large irregular groups commencing as discrete, subepidermal, yellowish-green spots, more or less obscured by the epidermal hairs. Peridium white to very pale yellow, when young closed at the apex, later opening with a lacerate, somewhat revolute margin, easily breaking off and leaving a shallow basin partly embedded in the host tissue. Peridial cells compact, firmly joined together, imbricate, occasionally subglobose, usually irregularly quadratic or polygonal, 14–20 × 17–26 μ; outer wall striated, about 4 μ thick; inner wall striated, verrucose, 1·5–2·8 μ thick. Aecidiospores subhyaline, 11–15 × 17–23 μ; epispore very finely verrucose, 1–1·5 μ thick.

on *Heliotropium Nelsoni* Wright, Potchefstroom District, 18.12.44, *W. J. Louw*, 35016.

Aecidium incertum Syd.

in Hedwigia XL (1901) p. (1).

The type specimen of this rust (Thuem. Myc. Univ. No. 1118) collected by MacOwan, is said to be on *Senecio napifolius* Schrad. (= *S. crucifolius* Linn.) which occurs in Europe and northern Asia. The material available for examination is sparse, but the host of the type collection is not *S. napifolius* nor does it appear to be an introduced weed. It is probably an indigenous species near *S. hastulatus* Linn.

Aecidium kakelense P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi Exped. (1903) p. 161 ; Syd. Monogr. Ured. IV (1924) p. 189.

Spermogonia sometimes present, not numerous, hypophyllous, interspersed with the aecidia, honey-yellow, 100–125 μ diam.

Aecidia hypophyllous, infected leaves showing a reddish discolouration on the upper surface and remaining expanded when normal leaves are revolute. Aecidia distributed closely and evenly over the whole leaf surface, cylindrical, 400–700 μ long, 250–350 μ diam. Margin of the peridium white, slightly re-curved, and becoming lacerate ; cells of the peridium firmly connected, sub-rhomboid, 22–30 $\times$ 18–24 μ ; outer wall conspicuously striate, 6–8 μ thick, inner closely verrucose, ca. 3 μ thick. Spores angular globose, ovate or ellipsoid, densely and minutely verruculose, 18–24 $\times$ 16–20 μ ; epispore 1·5 μ thick.

on *Euphorbia natalensis* Bernh., on leaves, Lidgetton, *Mogg*, 17034.

Euphorbia striata Thunb., Mooi River, *Mogg*, 11797.

Euphorbia sp., near *Eu. cyparissioides* Pax, Rusapi (Rh. 4292) 33426 ; Marandellas, *Hopkins* (Rh. 4822) 33428.

Aecidium kakelense was originally described by Hennings on a *Euphorbia* species " cum foliis minutis ca. 1 cm. longis ", collected by Baum near Kakele in South West Africa. The hosts listed above belong to the same group of *Euphorbia* spp.

Aecidium Nestlerae Doidge nov. spec.

Aecidia ramicola et foliicola, per ramulis leniter incrassatis irregulariter laxeque distributa, in foliis vix incrassatis amphigena, aurantiaca, 250–350 μ diam ; peridio diutius vesiculoso-clauso, tandem cylindraceo, usque 750 μ longo, aperto, margine erecto vix lacerato ; cellulis peridii firme conjunctis, imbricatis, rhomboideis v. irregularibus, 20–30 $\times$ 12·5–20 μ, pariete exteriore striato, 10–12·5 μ crasso, interiore verrucoso, 3–4 μ crasso, Aecidio-sporae aurantiacae, angulato-globosae, 17·5–25 $\times$ 15–20 μ, subleves, membrana hyalina ubique 1·25–1·5 μ crassa.

Hab. in ramulis foliisque *Nestlerae confertae* DC., Kafferfontein, Fauresmith, leg, P. Kies, 34096.

Aecidium Pentziae-globosae Doidge nov. spec.

Aecidia ramicola, pallide ochracea, per ramos juniores irregulariter et densiuscule distributa, matricem deformantia, 200–250 μ diam. ; peridio diutius vesiculo-clauso, tandem cylindraceo usque 1 mm. longo, margine albo leniter recurvato, plus minus inciso ; cellulis peridii firme conjunctis, subimbricatis, subrhomboideis v. oblongis, 25–40 $\times$ 15–22·5 μ, pariete exteriore striato, 10–12·5 μ crasso, interiore verrucoso, 4–5 μ crasso. Aecidio-sporae hyalinae v. subhyalinae, ovatae, oblongae v. irregulariter angulatae, 19–30 $\times$ 14–17·5 μ, minute denseque verruculosae, membrana 1–1·5 μ crassa, saepius ad apicem leniter incrassata (usque 4 μ).

Hab. in ramulis *Pentziae globosae* Less., prope Windsorton, leg. Acocks, 30661.

The fungus attacks the young shoots, which become thickened and branch abnormally, causing a tufted " witches' broom " effect.

Aecidium spinicolum Doidge nov. spec.

Aecidia in spinis tantum evoluta, eos deformantia et gallas irregulares formantia, totam superficiem gallarum obtegentia, profunde immersa, vix vel parum exserta, 350–500 μ diam., margine albido non vel vix recurvato, leniter inciso ; cellulis peridii firme conjunctis quoad formam valde variabilis, irregulariter angulatis, 25–40 $\times$ 12·5–22·5 μ, pariete exteriore striato, 7·5–10 μ crasso, interiore verrucoso, 3–4 μ crasso. Aecidiosporae irregulares plerumque ovatae v. ellipsoideae saepe angulatae, ad apicem interdum mucrona-

tae, dense minuteque verruculosae, hyalinae v. subhyalinae, 20–34 × 15–22·5 μ; episporio ca. 1·5 μ crasso, ad apicem saepe leniter incrassato, 2·5–3 μ rarius usque 4 μ.

Hab. in spinis *Acaciae* sp. (= A. Karroo) Weenen, leg. Pentz, 30923.

This fungus appears to attack only the spines of the host, which in the specimen examined are up to 11 cm. long. It often forms comparatively small, elongated tumours, 1–3·5 cm. long, but occasionally almost the whole of the spine is involved, the gall being up to 14 mm. diam. and the spine deformed.

Aecidium spinicolum appears, ex description, to be closely related to *Ae. immersum* P. Henn., occurring on *Acacia abyssinica* in Erythraea, but the latter species occurs on young branches and has thicker-walled spores, more decidedly thickened at the apex; no mucro is mentioned.

Cronartium Zizyphi Syd. and Butl.

in Ann. Myc. X (1912) p. 268; Syd. Monogr. Ured. III (1915) p. 579.

Uredo Zizyphi Pat., in Bull. Soc. Myc. Fr. XII (1896) p. 135.

Uredo-sori hypophyllous, scattered or in groups, not on leaf spots, but causing some indefinite discolouration of the leaf tissues, round to irregular, minute, punctiform or up to 0·3 mm. diam., light cinnamon-brown. Paraphyses very numerous, more or less incurved, clavate, golden-brown, often rather gnarled and irregularly curved and bent, 35–70 μ long, 8–14 μ broad; at the base and on the concave side thin-walled, wall about 1 μ thick; at the apex and on the convex side, wall 4–5 μ or occasionally up to 6 μ thick. Uredospores sometimes few in number, the sorus consisting mainly of paraphyses, mostly ovate or ellipsoid, less frequently subglobose, yellow-brown, moderately echinulate, 19–33 × 15–21 μ, epispore ca. 1·5 μ thick; germ pores obscure.

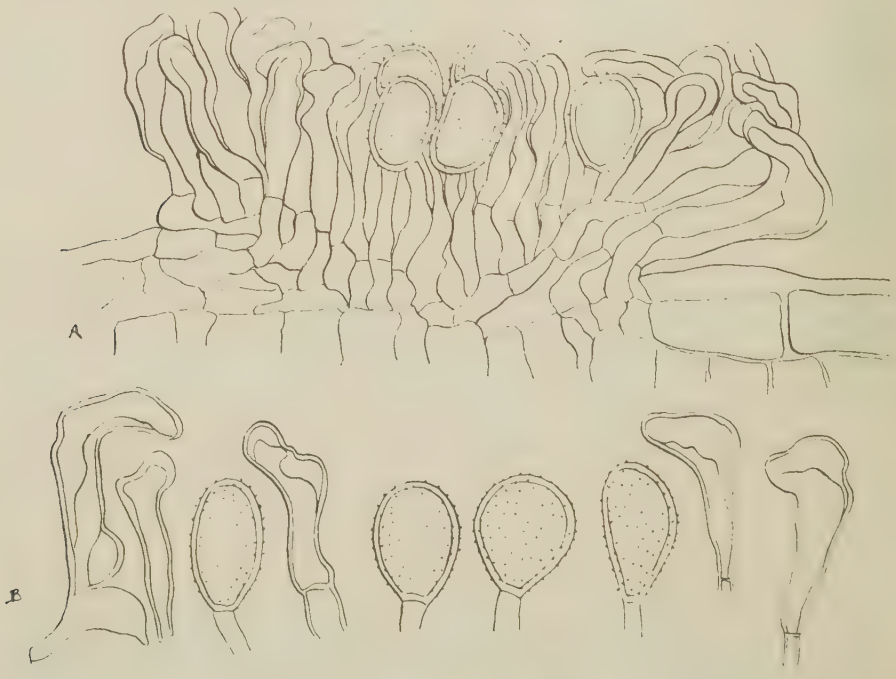


Fig. 1.—*Cronartium Zizyphi*;
(*a*) Section through uredo-sorus.
(**b**) Individual uredospores and paraphyses.

(Teleuto-sori arising from the centre of the uredo-sorus, filiform, straight or slightly curved, rusty-brown, 1·5–2·5 mm. long, 35–70 μ thick. Teleutospores cylindrical, smooth, yellow, 40–50 × 8–11 μ; epispore 1 μ thick.)

on *Zizyphus mucronata* Willd., on leaves, between Acornhoek and Tzaneen, *Liebenberg 3608*, 32724.

Only the uredo form is present on the specimen quoted, the description of the teleutosori being taken from Sydow and Butler (l.c.). The uredo is very characteristic and agrees in every detail with the description of the uredo of *Cronartium Zizyphi*; a number of rusts described from India have been found to occur in South Africa.

Puccinia Allii (DC) Rud.

in Linnaea IV (1829) p. 392; Syd. Monogr. Ured. I (1904) p. 614.

Uredosori amphigenous, scattered or crowded and becoming more or less confluent, ellipsoid or oblong, usually up to 0·5 mm. long; at first covered by the blistered epidermis, which ruptures longitudinally but remains partly veiling the yellowish-brown spore masses. Uredospores broadly ellipsoid or subglobose, 25–35 × 17·5–22·5 μ; wall 1·5–2 μ thick, finely and rather sparsely echinulate; germ pores 5–8, scattered.

Teleutosori amphigenous, scattered or in irregular groups, oblong or irregular in form and size, black, compact, remaining covered by the epidermis; often developing in oval to ellipsoid rings round the uredosori, the rings being up to 3 mm. long and 1 mm. broad. Teleutosori compound, composed of closely crowded individual sori; these are mostly 60–100 μ diam. and 100–125 μ deep, each surrounded by an envelope of firm, palisade-like golden-brown paraphyses. Teleutospores rather variable in form, mostly oblong-clavate to clavate, rather pale golden-brown, deeper brown at the apex, 45–80 × 20–27·5 μ; rounded, truncate or bluntly conical, sometimes oblique, at the apex, attenuate at the base; more or less constricted at the septum; wall smooth, 1·5–2 μ thick, slightly thickened at the apex, up to 8 μ. Pedicel hyaline, short, sub-persistent.

Fig. 2.—*Puccinia Allii*. Teleuto- meso- and uredo-spores.

Mesospores present, fairly numerous, similar in form to the upper cell of the teleutospore, ca. 40–45 × 17·5–20 μ.

on *Allium sativum* Linn., leaves and peduncles, Joubertina, *Reinecke*, 32390, 32687, 33332; Oudtshoorn, *du Plessis*, 33926.

Sydow (l.c.) mentions two species of Puccinia on *Allium* which have compact, paraphysate teleutosori :—

Puccinia Blasdalei Diet. et Holw. which has aecidia; it is an autoecious species and mesospores are found in the teleutosori. It occurs in America.

Puccinia Allii (DC.) Rud. which has neither aecidia nor mesospores; it is known on *Allium sativum* as well as on a number of other *Allium* spp., and occurs mostly in the Mediterranean region, including Algeria and Abyssinia.

Sydow also states that he had two Puccinias on *Allium sativum* and *Allium Dregeanum* from the Cape, the former having many, the latter few mesospores. He considers that these rusts are near *Puccinia Blasdalei*, but doubts whether they belong to this species.

The South African rust on garlic, described above, is in complete agreement with *Puccinia Allii* except for the presence of mesospores, and it is assigned to this species until further studies can be made. During recent years this rust has become destructive in plantings of garlic in the Long Kloof area of the Cape Province.

There is no specimen of rust on *Allium Dregeanum* in the Pretoria Herbarium, and attempts to find a rust on this host have not been successful.

Puccinia canaliculata (Schw.) Lagerh. var. **tenuis** Doidge var. nov.

A typo differt teleutosporis 35–65 × 11–15 μ, tenuioribus et pallidioribus; pedicello usque 50 μ longo; aecidiis ignotis.

Hab in foliis *Cyperi esculenti*, Brits., leg. F. M. du Toit, 33120.

Uredosori mostly hypophyllous, scattered, oblong, 0·5–2 mm. long, long remaining covered, but at length dehiscent by longitudinal slits, the ruptured epidermis being conspicuous on either side of the somewhat pulverulent spore masses. Uredospores broadly ellipsoid to ovate, 19–29 × 13–19 μ; epispore yellowish or cinnamon-brown, uniformly 1–2 μ thick, moderately and finely echinulate; germ pores 2, equatorial.

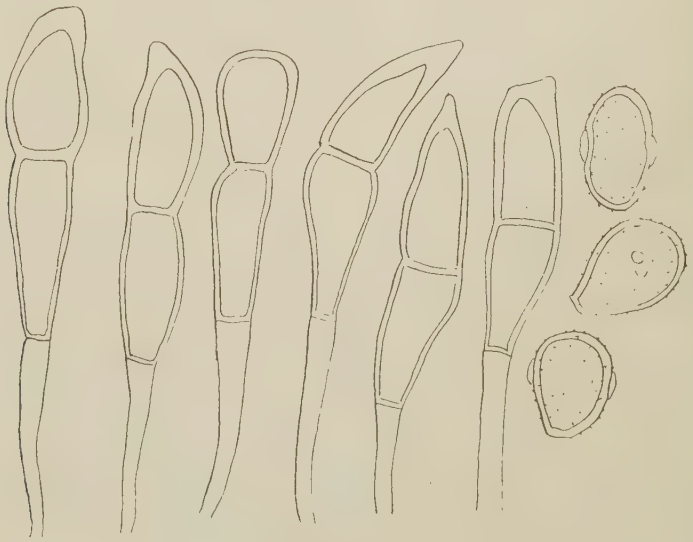


Fig. 3—*Puccinia canaliculata* var. *tenuis*. Teleuto- and uredo-spores.

Teleutosori hypophyllous, black or greyish-black, scattered or, more frequently, confluent in groups, 1–3 mm. long or longer, long covered by the epidermis, not raised above the leaf surface or only slightly so ; individual sori linear, 100 μ or less in diameter, surrounded by a well developed stroma which is chestnut-brown immediately below the crowded sori, becoming paler as it extends towards the upper epidermis ; individual sori separated by dark or paler chestnut-brown, palisade-like paraphyses. Teleutospores clavate-oblong, 35–65 μ long, 11–15 μ broad, acuminate, obtuse or rounded at the apex, not constricted at the septum or slightly so, gradually attenuate at the base ; epispore pale cinnamon-brown at the apex, paler towards the base, ca. 1 μ thick, thickened at the apex, 3–8 μ ; pedicel persistent, tinted, up to 50 μ long.

on *Cyperus esculentus* Linn., on leaves, Hartebeestpoort, Brits, *F. du Toit* 33120 ; Fort Beaufort, *Pole Evans* 302 ; II. Groenkloof, *Pole Evans*, 8930 ; Tweedie, *Mogg.* 23149 ; Hartebeestpoort, Brits, *Doidge* and *Bottomley*, 33270 ; Malagazi, Natal, *Wager*, 32719.

The South African rust was compared with an American collection on the same host (*Reliquiae Holwayana* 176) and with the description given by Kern (Mycologia XI, 1919, p. 136) in his studies on rusts on *Cyperus* and *Eleocharis*. In his key, *Puccinia canaliculata* (Schw.) Lagerh. is characterised by uredo-spores with two equatorial germ pores and wall uniformly 1–2 μ thick. The stromatic tissue beneath the paraphysate teleuto-sori is also characteristic.

The South African rust on *Cyperus esculentus* differs only in the form of the teleutospores, which are consistently more slender, 11–15 μ broad, compared with 15–21 μ in the type.

Puccinia Dichondrae Mont.

in Gay, Fl. Chil. VIII (1853) p. 46 et Crypt. (1856) p. 313. Syd. Monogr. Ured. I (1904) p. 321.

Puccinia Duthiei van der Byl in S. Afric. Journ. Sci. 24 (1927) p. 226.

Teleutosori hypophyllous, not causing leaf spots, very numerous and closely crowded, often occupying the whole leaf surfaces ; at first veiled by the leaf hairs, very minute and difficult to detect, then slightly larger, punctiform, subpulverulent, deep cinnamon-brown. Teleutospores oblong or oblong-clavate, sometimes asymmetrical and irregular, 25–45 × 14–19 μ, occasionally up to 24 μ broad ; more or less rounded or broadly conical at the apex, which is furnished with a hyaline or subhyaline papilla 1·6 μ long and 5–7·5 μ broad at the base ; rounded or somewhat attenuate at the base ; slightly constricted at the septum, cells usually sub-equal ; epispore smooth, thin, ca. 1 μ thick, not thickened at the apex ; pedicel delicate, subhyaline, up to 25 μ long, ca. 5 μ thick at the apex.

on *Dichondra repens* Forsk., on leaves, Grahamstown, *Archibald*, 33278 ; Belvidere, Knysna, *Duthie* (v. d. Byl 2337).

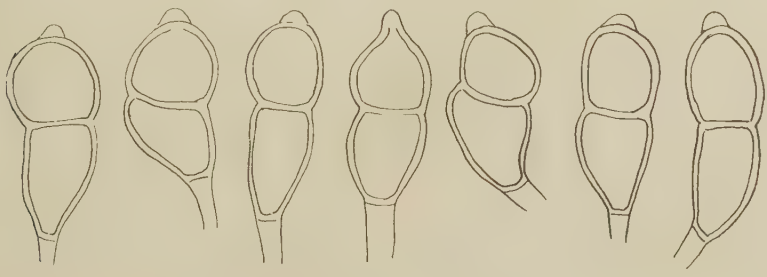


Fig. 4.—*Puccinia Dichondrae*. Teleutospores.

The type specimen of *Puccinia Duthiei* is *v. d. Byl 2337*; on this specimen there is a note in Miss Duthie's handwriting that the host is "possibly *Falkia repens*"; the plant was not found in flower. On comparison with specimens in the National Herbarium, there seems to be no doubt that the host is *Dichondra repens*, a somewhat similar plant, and that *Puccinia Duthiei* is identical with *P. Dichondrae*. The aecidia have not been found.

Puccinia Helianthi Schw.

O.I. Not seen.

II. Uredosori chiefly hypophyllous, not on leaf spots, pulverulent, cinnamon-brown. Uredospores globose, broadly ellipsoid or ovate, yellow-brown to brown, 22–34 × 19–26 μ; epispore dark cinnamon-brown, 1–2 μ thick, finely echinulate, with 2 equatorial germ pores.

III. Teleutosori amphigenous, but more numerous and conspicuous on the under side of the leaf, scattered, or in groups and becoming confluent, round, pulvinate, compact, blackish-brown, 0·5–2 mm. diam. Teleutospores ellipsoid, or oblong; at the apex more or less broadly rounded or obtusely conical, slightly constricted at the septum, rounded at the base, 35–58 × 20–30 μ, epispore chestnut-brown, smooth, 1·5–3 μ thick, thickened at the apex, which is paler, 6–12 μ; germ pores apical and just below the septum. Pedicel hyaline, stout, persistent, 8–10 μ thick and up to 115 μ long.

on leaves of *Helianthus annuus* Linn., Bulawayo, *Hopkins* (Rh. 5988) 34031; Naboomspruit, 34051; Buffelspoort, *Redpath*, 34077.

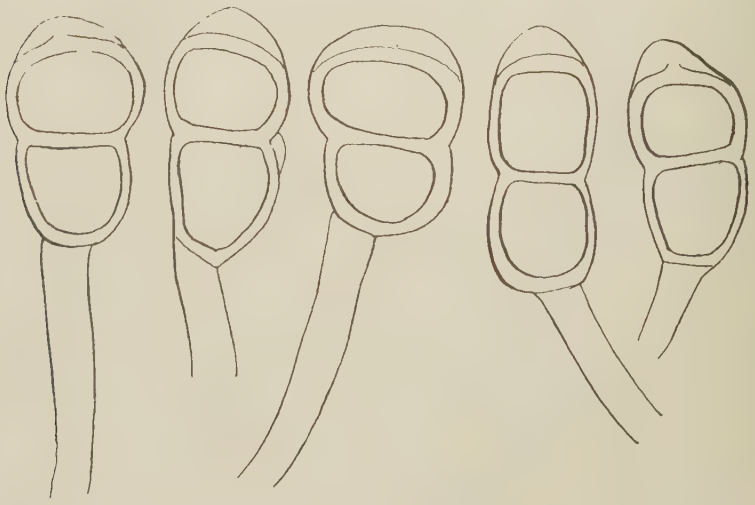


Fig. 5.—*Puccinia Helianthi*. Teleutospores.

The sunflower rust is apparently a recent introduction into southern Africa. In 1943, it was collected at Bulawayo by Hopkins and at Umbeluzi, Mozambique, by Cardoso. A report was received of a destructive outbreak of "rust" in commercial plantings of sunflowers in the northern Transvaal, in 1943, but it was not until January, 1944, that specimens were sent from Naboomspruit and identified as *Puccinia Helianthi* Schw.

Puccinia Isoglossae Doidge.

Bothalia II (1927) 72, 208.

The hosts of this fungus were wrongly determined; they are not *Isoglossa ovata* Nees and *I. Woodii* C.B.Cl., but *Hypoestes* sp. (No. 2399) and *Hypoestes verticillaris* R. Br. (No.

9075). Only teleutospores have been found on these two collections. *Uredo Hypoestis* Cooke and *Aecidium Acanthacearum* Cooke occur fairly commonly on species of *Hypoestes* and *Isoglossa*, but in the material available for study, no evidence could be found of any connection between these forms and *Puccinia Isoglossae*.

Puccinia Krookii P. Henn.

in Ann. Naturhist. Hofmus. Wien (1900) p. 1 ; Syd. Monogr. Ured. I (1904) p. 426 ; Doidge, Bothalia II (1927) p. 88.

This rust was originally collected at Harrismith by Krook on *Epilobium* sp., a number of subsequent collections having been made on *Epilobium hirsutum* (Doidge l.c.). According to Sydow, this species differs from *Puccinia Epilobii-tetragoni* on *Epilobium hirsutum* (DC.) Wint. in the absence of aecidia and the larger teleutospores tapering to the pedicel.

Recent collections have again been compared with *Puccinia Epilobii-tetragoni* on *Epilobium hirsutum* (Syd. Myc. Germ. 1464, 1465). *Puccinia Krookii* was collected by Mogg at Pyramids near Pretoria, the uredo- and teleuto-forms in January, 1940 (32434) and an aecidium on the same host and in the same locality in December 1939 (32654) ; some of the aecidia on the last-named collection are rather old and a few typical uredosori of *P. Krookii* have developed on the same leaves.

There is no difference between the aecidia of the two species ; there is no significant difference in the size of the uredospores and the germ pores appear to be similarly placed, but the uredospores of *P. Krookii* are usually darker and the germ pores more conspicuous. The teleutospores of *P. Krookii* are definitely longer and more frequently attenuated towards the pedicel ; they have a darker, finely punctuate epispore ; in teleutospores of *P. Epilobii-tetragoni* the epispores is smooth. The two rusts are evidently very closely related.

The aecidium of *P. Krookii* may be described as follows :—

Aecidia hypophyllous, distributed equally and closely over the whole leaf surface, cupulate, 250–350 μ diam. ; margin of the peridium white, laciniate, revolute ; cells of the peridium firmly joined together, mostly more or less rhomboid, 20–27·5 $\times$ 15–25 μ, outer wall finely striate, 5–6 μ thick, inner verrucose, 3–4 μ thick. Aecidiospores mostly ovate to broadly ellipsoid or oblong, often angular, 19–22·5 $\times$ 12·5–17·5 μ, very minutely verrucose, wall ca. 1·5 μ thick.

on *Epilobium hirsutum* Linn., Pyramids, near Pretoria, *Mogg*, 32645.

Puccinia Le Testui Maubl.

in Bull. Soc. Myc. Fr. XXII (1906) p. 71.

Aecidia on reddish-brown, indefinite leaf spots, hypophyllous, solitary or in small irregular groups of 2–5, scattered over the leaf surface, cupulate, 150–200 μ diam. Peridium white, margin laciniate ; cells of the peridium rhomboid, rather loosely connected, 19–35 $\times$ 16–19 μ, outer wall striate, 4–5 μ thick, inner verrucose, 3–4 μ thick. Aecidiospores angular globose to ellipsoid, subhyaline, densely and minutely verruculose, 18–24 $\times$ 16–20 μ ; epispore ca. 1 μ thick.

Teleutosori hypophyllous, interspersed with the aecidia and causing a similar reddish- or purplish-brown discolouration of the leaf tissues, scattered or in small irregular groups, black, pulvinate, compact, round or elliptic in outline, up to 1 mm. diam. ; at first covered by the blistered epidermis, which ruptures irregularly and often remains partly veiling the compact spore masses. Teleutospores oblong or oblong-clavate, chestnut-brown ; usually rounded at the apex, less frequently subtruncate or obtusely conical, in the latter case sometimes more or less oblique ; attenuate, rarely somewhat rounded at the base ; slightly constricted at the septum, cells sub-equal in length or the upper somewhat shorter, 36–52·5 $\times$ 16–25 μ ; epispore smooth, 2–2·5 μ thick, thickened at the apex, up to 8 μ ; germ pores

apical and just below the septum ; pedicel stout, persistent, up to 50 μ long, 6–8 μ broad at the apex, slightly tinted. Mesospores present, ellipsoid or subclavate, 28–45 $\times$ 16–20 μ.

on *Vernonia glabra* Vatke, Rusapi, R. Rhodesia (Rh. 4096) 33425.

Fig. 6.—*Puccinia Le Testui*. Teleutospores.

Puccinia Le Testui was described by Maublanc on a *Vernonia* sp. " e sect. Decaneuron ", collected at Marromen, Mozambique ; *Vernonia glabra* also belongs to that section of the genus.

In the material examined, there is a fairly distinct, apical germ pore in the teleutospores and—especially in spores tapering to the apex—a paler area at the apex, but there is no distinct papilla. With this exception, the Rhodesian rust agrees exactly with the description of the type.

Puccinia natalensis Diet. and Syd. var. **Evansii** Doidge.

This variety was described from two collections from the northern Transvaal of a plant identified as *Lantana salvifolia*. A more critical examination reveals that the host is not a *Lantana*, but a species of *Lippia*. The rust does not differ in any essential from *Puccinia lippiivora* Syd.

Puccinia natalensis var. *Evansii* must therefore be regarded as a synonym for P. *lippiivora*, the particulars being as follows :—

Puccinia lippiivora Syd.

Syn : *Puccinia natalensis* Diet. and Syd. var. *Evansii* Doidge in Bothalia II (1927) p. 82.

on *Lippia* sp., Barberton, *Pole Evans*, 1850 ; Duivelskloof, *Doidge*, 1816.

Puccinia Tetragoniae McAlp.

McAlpine in Agric. Gaz. of New South Wales VI (1895) p. 854 ; Syd., Monogr. Ured. I (1904) 563 ; Cunningham, The Rust Fungi of New Zealand (1931) p. 146.

var. **austro-africana** Doidge var. nov.

A typo differt uredosporis minoribus, 20–26 × 17·5–20 μ, episporio tenuiore 1·5–2 μ crasso; teleutosoris caulicolis, teleutosporis minoribus, 30–50 × 22·5–35 μ.

Hab. in foliis caulisque *Tetragoniae expansae*, Pietersburg, leg. Palte, 34095.

O.I. Pycnidia and aecidia not seen.

II. Uredosori amphigenous, mostly hypophyllous, scattered or in irregular groups, usually subcircular, sometimes elongated or irregular in outline, 0·5–1 mm. diam., cinnamon-brown, surrounded by the torn epidermis. Uredospores obovate, ellipsoid or subglobose, 22·5–32 × 17·5–25 μ; epispore pale yellow, rather closely and coarsely echinulate, 1·5–2 μ thick; germ pores rather conspicuous, 5–6, scattered.

III. Teleutosori caulicolous, none seen on the leaves in the South African material, in elongated, more or less elliptical groups, which sometimes coalesce; single sori almost round to elliptic, up to 1 mm. long, long remaining covered, later naked, black, bullate, surrounded by the torn epidermis. Teleutospores ellipsoid, subclavate or irregular in form, occasionally broader than long, deep chestnut-brown, 30–50 × 22·5–35 μ; apex usually rounded, sometimes truncate or conical, occasionally oblique; base rounded, seldom attenuate; slightly constricted at the septum, cells usually sub-equal, but the lower sometimes narrower or broader than the upper; epispore smooth, 3–4 μ thick, not thickened at the apex, or slightly thickened, 5–6 μ, rarely up to 8 μ; germ pores apical and just below the septum; pedicel persistent, slightly tinted at the apex, up to 35 μ long and 8 μ broad. Mesospores fairly numerous, clavate or irregular in form, 30–40 × 22–30 μ, similar in character to the teleutospores.

on *Tetragonia expansa* Murr., "New Zealand Spinach", on leaves and stems, Pietersburg, April 1944, *Palte*, 34095; Wellington, *Verwoerd* (Stell. 471); Stellenbosch, *Verwoerd* (Stell. 369.

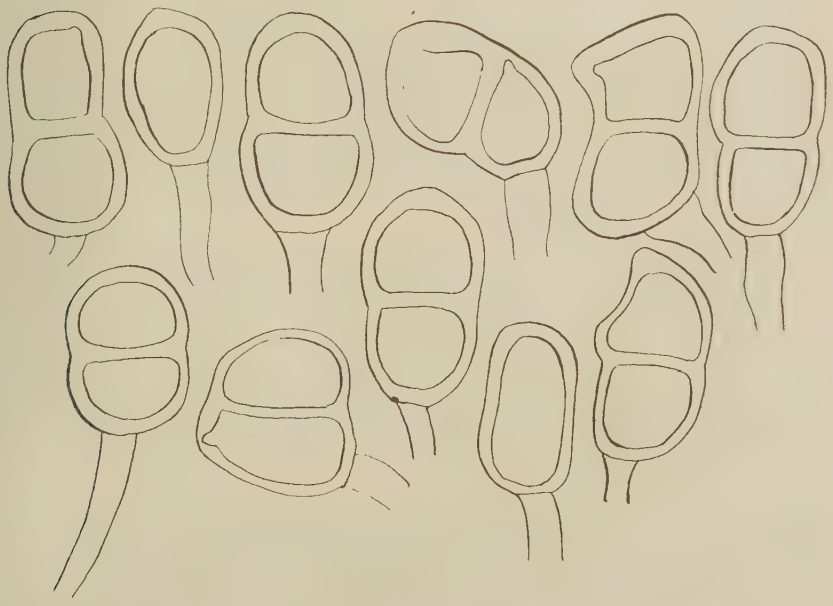


Fig. 7.—*Puccinia Tetragoniae* var. *austro-africana*. Teleutospores and mesospores.

To Dr. Cunningham I am indebted for material of two collections of *Puccinia Tetragoniae* McAlp. from New Zealand, one on *Tetragonia trigyna* and the other on *Tetragonia expansa*. Dr. Cunningham states that specimens of *T. implexicoma* from McAlpine's herbarium in

Melbourne, forwarded to him by C. C. Brittlebank, carried spores, which though slightly smaller, agreed so closely with those of the New Zealand rust, that he referred collections of the latter to McAlpine's species.

On the other hand, a comparison of the New Zealand material with the South African collections has confirmed the view that the South African rust should be regarded as a distinct variety. Collections from the Stellenbosch herbarium, kindly supplied by Dr. Dippenaar, agree in every particular with those from the Northern Transvaal.

Comparative measurements are as follows :–

Australian collections (McAlpine).....	Uredospores 27–32 × 22–25 μ. Teleutospores 39–59 × 25–31, av. 50 × 28 μ.
New Zealand collections (Cunningham)..	Uredospores 28–36 × 22–28 μ. Teleutospores 52–60 × 32–40, av. 56 × 36 μ.
South African collections.....	Uredospores 22·5–32 × 17·5–25 μ. Teleutospores 30–50 × 25–35, av. 40 × 27·5 μ.

The sori and spores of the South African collections are similar in character to those of typical *Puccinia Tetragoniae*, but the spores are consistently smaller and thinner walled. The teleutosori are caulicolous and not amphigenous as described by Cunningham for the type.

Ravenelia atrides Syd.

in Ann. Myc. X (1912) p. 438 ; Monogr. Ured. III (1915) p. 307 ; Doidge Bothalia II (1927) p. 153.

on *Grewia monticola* Sond., Nelspruit, *Doidge*, 32401.

Grewia kwebensis N.E. Br., Olifants River Camp, Kruger National Park, *Liebenberg 3609*, 32731.

This rust, previously only known from the Natal coast on *Grewia caffra* and *G. occidentalis*, has now been found in the eastern Transvaal on the hosts mentioned above.

Ravenelia Baumiana P. Henn.

in Bot, Ergebnisse der Kunene-Sambesi Exped. (1903) p. 157 ; Syd. Monogr. Ured. III (1915) p. 262 ; Doidge, Bothalia II (1927) p. 148.

on *Cassia delagoensis* Harv., Schagen, *Liebenberg 3579*, 30955 ; Nelspruit, *Doidge*, 32404.

This is a new host record ; *Ravenelia Baumiana* was originally collected by Baum at Humbe, South West Africa on *Cassia goratensis* Fres., it has also been found in Southern Rhodesia on that host.

Ravenelia MacOwaniana Pazschke.

The teleutosori of this rust are described as occurring on the leaves, amphigenous round, 0·5-1 mm., diam., dark brown. A recent collection (32169) on *Acacia Karroo* Hayne, made by Dr. Leeman at Grahamstown, shows teleutosori produced in groups on slightly thickened branches ; large incrustations are formed, extending along the small branches to a length of 1–6 cm. The sori develop on the inner bark, pushing up the outer bark, which becomes detached in superficial scales. Only a few leaflets were included in the collection and on those typical sori were observed. The spores from sori on branches are indistinguishable from those found in the leaf sori.

Ravenelia modesta Doidge.

in Bothalia III, 1 t. IV ; p. 504 (1939).

Aecidia fructicolous, in more or less circular groups, up to 1 cm. diam., on somewhat hypertrophied parts of green legumes, closely and fairly evenly distributed, deeply immersed (ca. 500 μ) in the tissues of the host, the torn epidermis forming a collar round the upper part of the peridium, which is exserted up to 500 μ. Aecidia 300–400 μ diam., briefly cylindrical, margin erect, denticulate. Cells of the peridium imbricate, firmly jointed together, very irregular in form and size, often rhomboid or oblong, mostly 30–50 × 12·5–20 μ ; outer wall striate, 7·5–9 μ thick, inner verrucose, 3–4 μ thick. Spores ovate, subglobose or irregular in form, often angular, pale, 21–28 × 12·5–21 μ ; wall subhyaline 2–2·5 μ thick, not thickened at the apex, very finely and closely verruculose.

Separate uredo-sori not seen ; uredospores found round the margin of the teleutosori, pale, ellipsoid, ovoid or subglobose, 25–35 × 15–25 μ ; epispore ca. 2 μ thick, finely and rather distantly verruculose-echinulate ; germ pores numerous, scattered. Paraphyses numerous, pale fuscous, clavate or clavate-spathulate, occasionally subcapitate, straight or curved, 40–50 μ long ; 7·5–10·5 μ thick at the apex.

on leaves and pods of *Acacia Gillettae* Burtt Davy, Bosplaas, between Hamanskraal and Pienaars River, 21/3/45, *A. O. D. Mogg*, 34572.

The teleutospores of *Ravenelia modesta* were described and illustrated (Doidge, l.c.) from sori occurring on leaves of *Acacia stolonifera* Burch. ; a re-examination of the type material reveals a few uredospores at the margin of the teleutosori, but these are parasitised, by *Darluca filum*. In the collection quoted above on *Acacia Gilletae*, a closely related species of *Acacia*, there are well-developed aecidia and fairly numerous uredospores in the teleutosori.

Uredo Dombeyae Doidge nov. spec.

Sori amphigeni, sparsi, primitus sine maculis, minuti, ca. 0·5 mm. diam., plus minus rotundati, mox nudi, brunnei, deinde majores, ca. 3 mm. diam. maculis brunneis ca. 5 mm. diam. insidentes. Uredosporae plerumque ovatae, rarius subglobosae, ellipsoideae v. clavatae, subhyalinae v. pallide flavo-brunneae, remote aculeatae, aculeis usque 1 μ longis, 32·5–50 × 20–27·5 μ, episporio 4–5 μ crasso, nonnunquam usque 6 μ, ad apicem incrassato, 8–12 μ, poris duobus distinctis aequatorialibus oppositis praedita.

Hab. in foliis *Dombeyae natalensis* Sond., Stella Bush, Durban, leg. Wager, 33193.

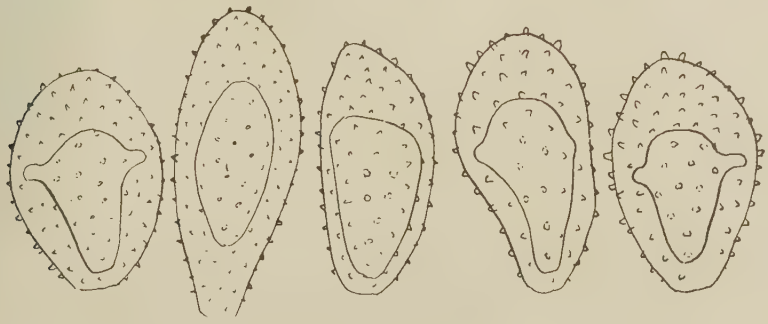


Fig. 8—*Uredo Dombeyae.* Uredospores.

Uredo Ehrhartae-calycinae Doidge nov. spec.

Sori amphigeni elliptici sparsi vel hinc inde aggregati sed haud confluentes elliptici, 0·5–1·5 mm. longi, primitus epidermide tecti dein ea fissa cincti, pulverulentes, cinnamomei, Spori ovati, ellipsoidei v. subglobosi, pallide brunnei v. flavo-brunnei, 20–29 × 17·5–20 μ, verruculoso-echinulati, episporio 3·5–4 μ crasso, prois germ. 4–6 sparsis praedito.

Hab. in foliis *Ehrhartae calycinae*, Stellenbosch, leg. Verwoerd (Herb. Stell. Elsenburg Coll. Agric. 41) 34098.

No uredo has been found associated with *Uromyces Ehrhartae-giganteae* Doidge of which several collections on *Ehrharta gigantea* have been examined, and no teleutospores are to be found on the collections of *Ehrharta calycina* available.

Uromyces Ehrhartae McAlp., which occurs on a grass of a closely related genus, *Microlaena stipoides* R. Br., has uredo-sori which closely resemble those of *Uredo Ehrhartae-calycinae*. According to McAlpine's description (The Rusts of Australia, 1906, p. 86) the uredospores are subglobose to oval, orange, finely echinulate, 21–25 × 18–20 μ, with 3–4 scattered germ pores on one face. The thickness of the wall is not mentioned. The South African rust described above, has very thick-walled spores, which are coarsely verruculose-echinulate and have 4–6 scattered germ pores.

Uredo rhoina Syd.

in Deutsche Zentral Afrika Exped. 1907/8, Berlin (1910) p. 97; Monogr. Ured. IV (1924) p. 456.

Uredosori hypophyllous, scattered or becoming numerous and crowded, very minute or up to 2 mm. diam., cinnamon-brown, early becoming naked, pulverulent, more or less concealed amongst the stellate hairs on the leaf of the host. Uredospores very variable in form, ovate, ellipsoid, subglobose, oblong or clavate, 20-35 × 15–21 μ; epispore ca. 1·5 μ thick, often somewhat thickened (up to 5 μ) at the apex, which is rounded or bluntly conical; briefly verrucose-aculeate, being closely set with acute verrucae arranged in indistinct longitudinal rows; germ pores 2–3 equatorial.

on *Lannea discolor* Sond., leaves, Nelspruit, *Doidge*, 32395.

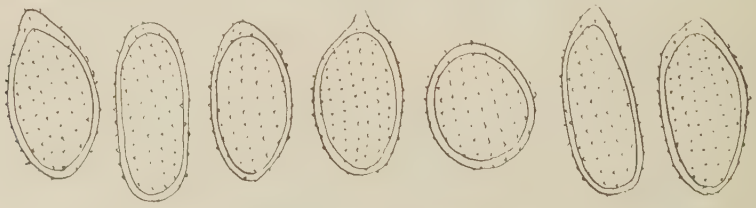


Fig. 9.—*Uredo rhoina*. Uredospores.

Uromyces Aloes (Cooke) P. Magn.

in Ber. Deutsch. Bot. Gesellsch. X (1892) p. 48; Syd. Monogr. Ured. II (1910) p. 265; Doidge, Bothalia II (1927) p. 39.

on *Haworthia atilinea* Haw., Vincent, C.P., *G. G. Smith*, 33326.
Haworthia Reinwanatii Haw., Vincent, *G. G. Smith*, 33324.
Haworthia retusa (L.) Haw., Vincent, *G. G. Smith*, 33325.
Haworthia spp., Vincent, *G. G. Smith*, 33252, 33327.

This rust has been recorded on a large number of *Aloe* spp., and is extremely common on plants belonging to that genus; it has not been recorded on hosts belonging to other genera. The plants of *Haworthia* spp. found infected, were growing in cultivation near infected Aloes; the sori are comparatively small on these hosts, but the teleutospores are identical with those found on *Aloe* spp.

Uromyces Cassiae-mimosoidis Doidge nov. comb.

Uredo Cassiae-mimosoidis Doidge in Bothalia IV (1941) p. 233.

Uredo-sori amphigeni, sparsi v. aggregati, rotundati v. elliptici, 0·5-0·75 mm. longi, interdum confluentes, ferruginei, pustuliformes, diutius epidermide pallida tecti, dein ea fissa cincti vel semivelati, pulverulenti. Uredosporae ovatae, ellipsoideae, subglobosae v. irregulares, 21–27·5 × 16–21 μ densiuscule breviterque echinulatae, aureo-brunneae, episporio 1·75–2·5 μ crasso, poris germ. 2–4, plerumque 3, equatorialibus, conspicuis.

Teleuto-sori conformes, cinnamomei. Teleutosporae aureo-brunneae, ellipsoideae ovatae, subglobosae v. plus minus irregulares, interdum angulatae, 17·5–30 × 12·5–17·5 μ, plerumque 20–25 × 15 μ, ad apicem rotundatae, papilla hyalina 5–6 μ lata, 1–1·5 μ alta, ornatae, verrucis majusculis fere hemisphericis ca. 1 mm. latis irregulariter dispositis, episporio 1·5–2 μ crasso, apice haud incrassato; pedicello brevi, persistenti, hyalino.

Hab. in foliis Cassiae mimosoidis Linn., Buffelspoort, leg. Doidge et Bottomley, 32170.

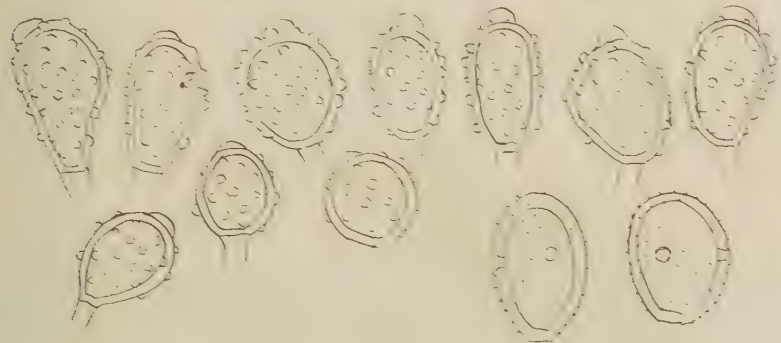


Fig. 10.—*Uromyces Cassiae-mimosoidis*. Teleuto- and uredo-spores.

The uredo-form was also found at Fairy Glen near Pretoria, *Doidge*, 30015, and at Donkerpoort, Pretoria Distr., *Doidge and Bottomley*, 29741.

Uromyces euphorbiicola (Berk. and Curt.) Tranzsch.

in Ann. Myc. VIII (1910) p. 8; Syd. Monogr. Ured. II (1910) p. 16, sub *Uromyces proëminens* (DC) Lèv. in Doidge, Bothalia II (1927) p. 10.

on *Euphorbia prostrata* Ait., Durban, *Medley Wood*, 809, 11124, 14200; Maritzburg, *J.M.Sim*, 9202; Pretoria, *Pole Evans*, 6962, *Hesse*, 30043; Salisbury [Rh. 2972].

Some of the collections quoted were recorded in a previous paper [Doidge l.c.] as *Uromyces proëminens* (DC. Lèv., the host having been incorrectly determined as *Euphorbia inaequilatera* Sond.

The aecidia and the uredo- and teleuto-sori of the two rusts are very similar, the chief difference being in the uredospores. In *Uromyces euphorbiicola* the uredospores have most commonly 3 equatorial germ pores, rarely 2 or 4. Uredospores of *U. proëminens* have 4–6 germ pores, most commonly 5, of which one is apical; the latter rust is not known to occur on *Eu. prostrata*.

Uromyces Krantzbergensis Doidge nov. spec.

Teleuto-sori amphigeni, sparsi v. plures aggregati et dense dispositi, primitus elliptici, 4–6 × 1·5–2 mm., confluendo saepe usque 2 cm. longi et 4 mm. lati, epidermide bullose diu tecti dein ea semivelati, valde pulverulenti, cinnamomei. Teleutosporae quoad formam variabiles, subglobosae, ovoideae v. oblongae, saepe plus minus angulatae, leves, pallide aureo-brunneae, 22·5–32·5 × 22·5–27·5 μ, episporio ca. 2·5 μ crasso, apice haud vel leniter incrassato (4–5 μ); pedicello hyalino, deciduo, usque 50 μ longo, apice 4–5 μ crasso.

Hab. in foliis *Liliaceae* indet., Krantzberg, leg. Dyer, Verdoorn et Evans, 34305.

Sori amphigenous, scattered or in elliptic groups: single sori elliptic, 4–6 × 1·5–2 mm., usually becoming coalescent and forming larger sori up to 2 cm. long and 4 mm. broad, often occupying the whole width of the leaf: long covered by the pale, blistered epidermis, which finally ruptures but remains partly veiling the pulverulent, cinnamon-brown mass of spores.

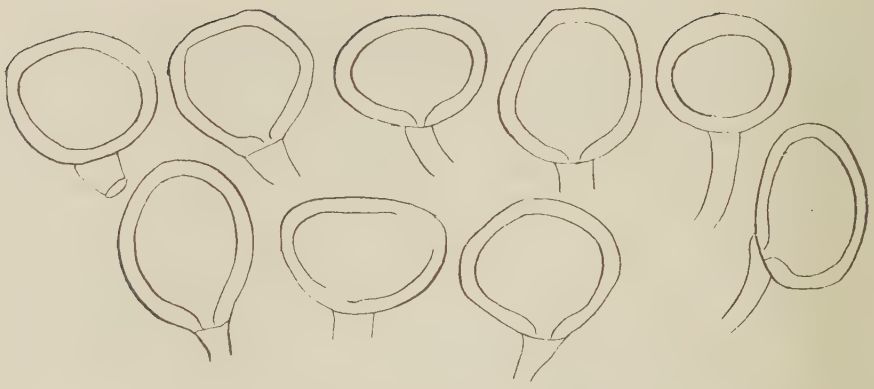


Fig. 11.—*Uromyces Krantzbergensis.* Teleutospores.

Teleutospores very variable in form, globose, flattened globose, ovoid or oblong, frequently broader than long and often more or less angular; broadly rounded or flattened at the apex, more or less rounded at the base; epispore smooth, pale golden-brown, ca. 2·5 μ thick, not thickened at the apex or very slightly so (4–5 μ), germ pore basal, immediately above the pedicel; pedicel deciduous, hyaline, up to 50 μ long, 4–5 μ thick at the apex and tapering downwards.

on leaves of *Liliaceae* undet., probably *Anthericum* sp., on Farm Waterval, western side of the Krantzberg, on slopes towards the Matlabas River, north-western Transvaal, 5/1/42, *Dyer, Verdoorn and Erens 4197*, 34505.

Uromyces Maireanus Syd.

in Monogr. Ured. II (1910) p. 280; Doidge, Bothalia II (1927) p. 43.

Aecidia hypophyllous, rather closely crowded in elliptical groups up to 6 mm. long; at first closed, covered by the raised epidermis, then open, cupulate, 250–350 μ diam.; margin of the peridium white, erect, denticulate, surrounded by the torn epidermis. Cells of the peridium rather loosely connected, subrhomboid, oblong or irregular, 25–40 × 15–22·5 μ; outer wall smooth, 5–6 μ thick, inner finely verrucose, 2·5–4 μ thick. Aecidiospores yellow in mass; single spores subhyaline, globose, ovate or ellipsoid, often more or less angular, 20–27·5 × 15–21 μ; wall finely and closely verruculose, 1·5–2 μ thick.

on *Ornithogalum flavovirens* Bkr., on leaves, Grahamstown, *Archibald*, 33275, 33328.

The aecidium was not described by Sydow. On No. 33328, the aecidia are closely associated with the uredo- and teleuto-sori on the same leaves. This rust was originally described on *Ornithogalum sessiliflorum* collected by Maire in Algiers; in South Africa it has been found on *O. Roodeae*, collected at Clanwilliam, and on *O. flavovirens* as recorded above.

Uromyces Polemanniae Kalchbr. and Cooke.

in Grevillea XI (1882) p. 21; Syd. Monogr. Ured. II (1910) p. 52; Doidge, Bothalia II (1927) p. 16.

on *Polemannia montana* Schlechtr. and Wolf, Bulwer, Natal, *Haygarth*, 33228.

This rust, which apparently is somewhat rare, has only been known from the type collection on *Polemannia grossulariaefolia* E. and Z., found near Somerset East by MacOwan. It has now been detected on a second host, *Polemannia montana*.

Uromyces Rhynchosiae Cooke emend. Doidge.

Uromyces ? Rhynchosiae Cooke, Grevillea X (1882) p. 24.

Uredo (*Trichobasis*) *Rhynchosiae* Kalchbr., Grevillea XI (1882) p. 24.

Puccinia Rhynchosiae Kalchbr. and Cooke, Grevillea XI (1992) p. 24.

Uromyces Dolichi Syd. (non Cooke) Monogr. Ured. II (1910) p. 122.

Uredospores hypophyllous, rarely a few scattered sori are to be found on the upper side of the leaf, minute, up to 0·3 mm. diam., scattered, often numerous, crowded and closely set over the whole leaf surface, but only occasionally becoming confluent, cinnamon-brown, pulverulent, surrounded by the torn epidermis. Uredospores globose, subglobose or broadly ellipsoid, golden-brown, 20–30 × 18–22 μ, mostly 22–25 × 18–20 μ; epispore golden-brown, 2·5–3 μ thick, minutely and rather sparsely echinulate; germ pores equatorial, usually 3, less frequently 2 or 4.

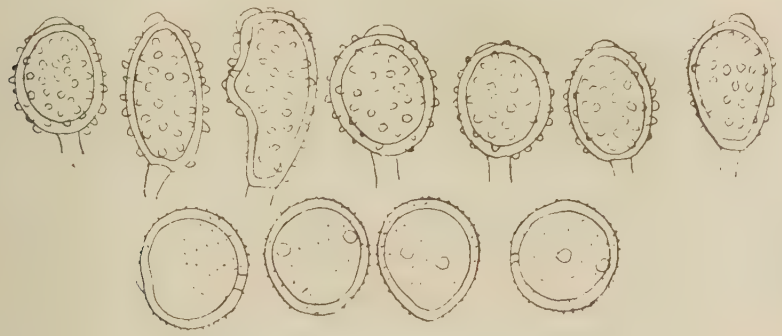


Fig. 12.—*Uromyces Rhynchosiae.* Teleuto- and uredo-spores.

Teleuto-sori similar to the uredo-sori but darker brown, pulvinate and less pulverulent. Teleutospores chestnut-brown, globose, ovate or ellipsoid, rounded at the apex, rounded or somewhat attenuate at the base, 18–27·5 × 16–20 μ; usually papillate at the apex, the papilla being hyaline or subhyaline, flattened hemispherical, 6–7 μ broad and 2·5–3 μ high; epispore 2·5–3 μ thick, not thickened at the apex, rather grossly verrucose, being set with rounded warts, irregularly placed; germ pore apical; pedicel short, hyaline, persistent.

on *Eriosema cajanoides* Benth., Schagen, *Liebenberg*, 29930.

Eriosema cordatum E. Mey., Inanda, *Medley Wood 556, 621*, 361, 10937, 11121, Kew.

Eriosema salignum E. Mey., Inanda, *Medley Wood 528*, 10618, Kew; Winkle Spruit, *Pole Evans*, 2371.

Eriosema spp., Entumeni, *Haygarth*, 14182; Lemana, *Doidge*, 1800, 1801.

Flemingia Grahamiana W. and A., Natal, *Medley Wood 553, 610*, 10627, Kew.

Rhynchosia adenodes E. and Z., *Medley Wood 29*, Type, 10502, Kew.

Rhynchosia caribaea DC., Garstfontein, *Pole Evans, Pienaar*, 8901; Donkerpoort, *Doidge* and *Bottomley*, 30082; Pretoria, *Mogg*, 26366; Durban, *McClean*, 31028; Waterkloof, *Bosman*, 32889.

Rhynchosia Harmsiana Linn., Kentani, *Pegler*, 7811.

Rhynchosia Memnonia DC. var. *prostrata* Harv., Hebron, *Pole Evans*, 9053.

Rhynchosia orthodanum Benth., Inanda, *Medley Wood 565, 579*, 848, 10635, 10636, 11150, Kew.

Rhynchosia secunda E. and Z., East London, *Doidge*, 22415.

Rhynchosia totta DC., Pretoria, *Pienaar*, 2136.

Rhynchosia spp. undet., Inanda, *Medley Wood 24*, 10595, *Medley Wood 617*, 10619; Garstfontein, *Pienaar*, 1427; Pretoria, *Pole Evans*, 1431; Tugela Valley nr. Mont aux Sources, *Doidge*, 14155, 14163; East London, *Pienaar*, 2171; Silikats Nek, *Bosman*, 29898.

There has been some confusion between *Uromyces Dolichi* Cooke and *Uromyces Rhynchosiae* Cooke, partly owing to incorrect identification of some of the host plants.

In Grevillea X (1882) p. 127, the following statement follows the name:

" Uromyces Dolichi Cooke:

I. *Aecidium Dolichi* Cooke, on leaves, petioldes and legumes of *Dolichos axillaris* Inanda, *Medley Wood 640*.

II. *Uredo Dolichi* B. and Br., Fungi of Ceylon 829?

III. *Uromyces phaseolorum* forma in *Dolichi gibbosi* etc."

Aecidium Dolichi Cooke, *Medley Wood 640* is Synchitrium Dolichi (Cke.) Gaumann. *Uredo Dolichi* B. and Br. is not a South African form and if the teleuto-form is " *Uromyces phaseolorum* forma " it is most probably *Uromyces Vignae* Barcl., which occurs on *Dolichos* spp.; there is no description and Cooke quotes no numbers for the teleuto-stage. *Uromyces Dolichi* Cooke is probably a synonym for *Uromyces Vignae* Barcl. The description of *U. Dolichi* in Sydow's Monograph (l.c.) applies to *Uromyces Rhynchosiae* Cooke and cannot be connected with *U. Dolichi* Cooke; again no numbers are quoted.

On the same page of Grevillea (Vol. X p. 127) *Uromyces Rhynchosiae* Cooke is characterised as follows:—

" I. *Aecidium Rhynchosiae* Cooke, on *Rhynchosia*, *Medley Wood 557*.

II. *Uredo* (*Trichobasis*) *Rhynchosiae* Kalchbr., on *Rhynchosia*, *Medley Wood 29*; on *Eriosema salignum*, *Medley Wood 528*, *556*; on *Flemingia*, *Medley Wood 553*.

III. Not seen."

Aecidium Rhynchosiae Cooke, *Medley Wood 557*, is *Synchitrium Dolichi*. According to Sydow (Monogr. Ured. II, 1910, p. 350) *Uromyces Rhynchosiae* is only a uredo-form and to be excluded from the genus *Uromyces*. Portions of the collections quoted by Cooke and Kalchbrenner have been examined; a few typical teleutospores were found mixed with the uredospores of *Medley Wood 29*, which must be regarded as Cooke's type for *Uromyces Rhynchosiae*; this number is also quoted by Kalchbrenner (Grevillea XI, 1882, p. 24) as the uredo-form of *Puccinia Rhynchosiae* Kalchbr. and Cooke. The fungus has been re-described from No. 14163 on an undetermined species of *Rhynchosia*.

This rust is common on species of *Rhynchosia* and occurs also on *Eriosema* and *Flemingia*; it has not been found on any *Dolichos* sp. Teleutospores are usually found rather late in the season, the best material having been collected in May and June.

Uromyces saginatus Syd.

in Ann. Myc. 26 (1928) 132.

Teleutosori amphigenous; single sori at first minute or of medium size, round or oblong, developing in series and becoming confluent and then 2 to 10 mm. long and 1 mm. broad; compound sori finally developing concentrically and becoming lenticular in outline and up to 20 × 5 mm. Sori at first covered by the lead-coloured, raised epidermis, which ruptures and remains surrounding or partially veiling the pulverulent, rusty-brown spore masses. Teleutospores variable in form, subglobose, ovate, ellipsoid or oblong, almost always more or less angular, golden-brown, 28–52 × 20–35 μ, the majority 30–45 μ long;

epispore smooth, 5–8 μ thick, varying in thickness, the side or base—rarely the apex—being thicker than elsewhere. Pedicel hyaline, deciduous, ca. 6 μ thick and up to 55 μ long, slightly tinted at the apex.

on *Urginea altissima* Bkr., Heany Junction, Bulawayo, *Hopkins* (Rh. 5873).

Fig. 13.—*Uromyces saginatus.* Teleutospores.

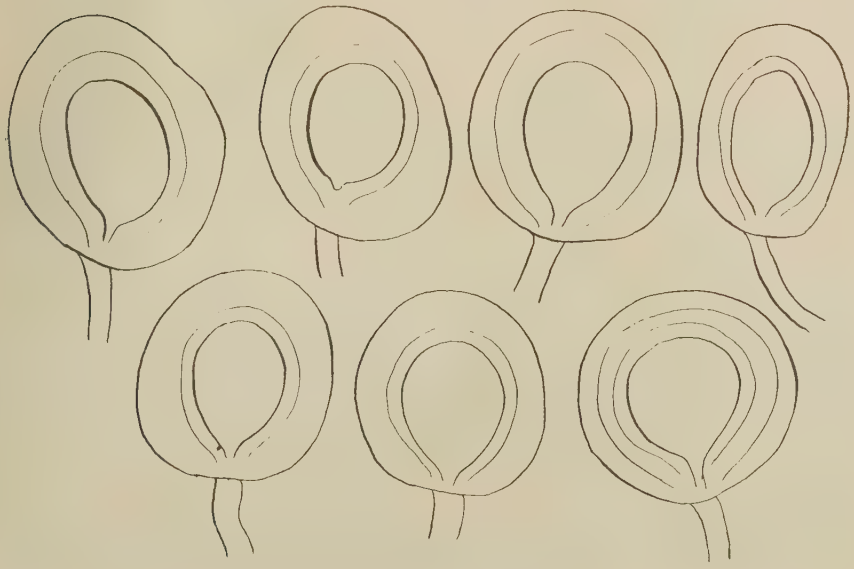


Fig. 14.—*Uromyces Holubii.* Teleutospores.

The type specimen, collected at Auros (Otavi) South West Africa, by Dinter (*K. Dinter 5673*) has not been seen, but the Bulawayo specimen is on the same host and conforms very closely to the original description. This species is similar to *Uromyces Holubii* Doidge, but the teleutospores are consistently smaller; drawings of the two rusts are reproduced for comparison, they appear to be distinct.

Uromyces stellenbossiensis v. d. Byl.

in Duthie, Ann. Univ. Stell. VI A, No. 2 (1928) p. 4.

Uredo-sori similar to the teleuto-sori, but paler, or uredospores mixed with the teleutospores in the same sori. Uredospores subhyaline or pale yellow, ovate, subglobose or ellipsoid, 25–32·5 × 20–25 μ; epispore thin, 1–1·5 μ thick, very minutely verruculose echinulate and with several (ca. 7) small, scattered germ pores.

Teleutospores amphigenous, on elliptic, greenish-yellow leaf spots, elongated lenticular, at first pale, becoming dark purplish-brown, long covered by the raised epidermis. Teleutospores subglobose, ellipsoid, oblong, obovate or cuneate, sometimes asymmetrical or somewhat angular, golden-brown to chestnut-brown, 28–42 × 18–28 μ; apex usually rounded, occasionally truncate, very rarely conical; base attenuate or rounded; epispore smooth, ca. 2 μ thick, not thickened at the apex. Pedicel persistent, slightly tinted yellowish-brown, especially at the apex, up to 35 μ long; either 5–6 μ broad at the apex and tapering gradually downwards, or about 9 μ thick, attenuated suddenly below to 4 or 5 μ.

on *Urginea exuviata* Steinh., leaves, Stellenbosch, *Duthie* (v. d. Byl 2479).

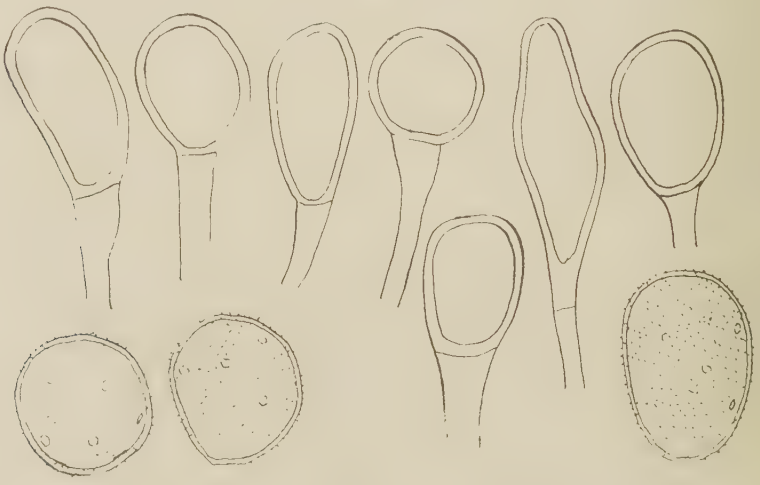


Fig. 15.—*Uromyces stellenbossiensis*. Uredo- and teleuto-spores.

The uredospores were not described by van der Byl. Of the other *Uromyces* spp. occurring on *Liliaceae* in South Africa, *U. stellenbossiensis* most closely resembles *U. Maireanus* Syd. on Ornithogalum; the teleutospores are similar in form to those of the latter species, but are slightly larger and the epispore thicker. Teleutospores of *U. Maireanus* are 20–34 × 12–24 μ, with epispore 1·5 μ thick. From *U. Bulbinis* Thuem. it differs in the scattered sori, which do not coalesce to form large groups and in the teleutospores which are darker brown, with thinner epispore not thickened at the apex.

Uromyces Vignae Barcl.

in Journ. Asiat. Soc. Bengal LX (1891) p. 211; Syd. Monogr. Ured. II (1910) p. 124.
?*Uromyces Dolichi* Cooke ("*Uromyces phaseolorum* forma") in Grev. X (1882) p. 127.
?*Aecidium* sp., Hopkins, Trans. Rhod. Sc. Ass. 35 (1938) p. 105.

Nigredo Vignae (Barcl.) Fromme, Phytopath. XLV (1924) p. 72.

Uromyces Vignae-luteolae P. Henn., Ann. Mus. Congo II (1907) p. 95.

Spermogonia epiphyllous, in small circular groups, honey-yellow, becoming brownish, globose or flattened-globose, 100–125 μ diam.; ostiolar filaments short.

Aecidia chiefly hypophyllous and petiolicolous, in circular groups 2–4 mm. diam., often arranged in concentric rings, briefly cupulate, margin recurved, irregularly lacerate, 200–300μ diam., Cells of the peridium rhomboid or oblong, slightly imbricated, 16–20 $\times$ 20–25 μ, outer wall transversely striate, smooth, 3–5 μ thick, inner verrucose, 2–3 μ thick. Aecidiospores ellipsoid or oblong ellipsoid, 16–20 $\times$ 20–29 μ; wall colourless, 1–1·5 μ thick, closely and minutely verruculose.

Uredo-sori amphigenous and petiolicolous, scattered, round to irregular, up to 1 mm. diam., early naked, chestnut-brown, surrounded by the ruptured epidermis. Uredospores ellipsoid or ovate-ellipsoid, 24–30 $\times$ 18–22 μ, wall cinnamon-brown, 1·5–2 μ thick, finely and closely echinulate; germ pores 2, conspicuous, markedly super-equatorial.

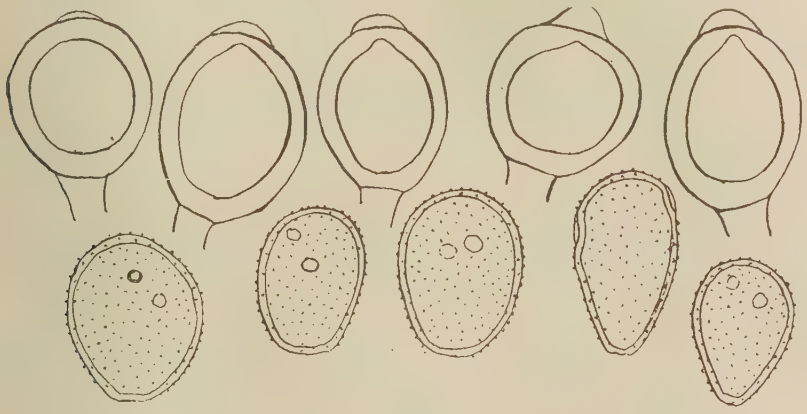


Fig. 16.—*Uromyces Vignae.* Teleuto- and uredo-spores.

Teleuto-sori amphigenous and petiolicolous, ca. 0·5 mm. diam., blackish-brown, early naked, somewhat pulverulent, surrounded by the ruptured epidermis. Teleutospores broadly ellipsoid, 27–35 $\times$ 20–25 μ, rounded or broadly conical at the apex, usually rounded at the base; epispore smooth, dark chestnut-brown, 2–2·5 μ thick, 4–6 μ thick at the apex, including the hyaline, hemi-spherical papilla. Pedicel hyaline, fragile, rarely equalling the spore in length.

on *Dolichos falciformis* E. Mey., Lemana, *Doidge*, 1827.

? *Dolichos gibbosus* Thunb., Somerset East, *MacOwan*; Durban, *Medley Wood 40*. *Dolichos lupiniflorus* N.E.Br., Wellesley, S. Rhodesia, *Hopkins*, Rh. 2232; Mteptepa, Rh. 1849; Goromanzi, Rh. 4263.

Vigna stenophylla Burtt Davy, Donkerpoort, *Doidge* and *Bottomley*, 30081.

Vigna unguiculata (Linn.) Walp., Nelspruit, *Liebenberg*, 26069; Cedara, *Staples*, 15432; Bathurst, *Preddy*, 20426; Glendale, Rh. 1248, Kew.

Vigna sp., Wellesley, Rh. 2249, Rh. 2233; Rusapi, Rh. 4498.

Fromme (l.c.) pointed out that the rust on cowpea and related hosts is distinct from *Uromyces appendiculatus* on *Phaseolus* spp. The most distinct difference is the position of the germ pores in the uredospores; in *U. appendiculatus* they are two, equatorial and not easily seen; in *U. Vignae* their position is distinctly super-equatorial and they are readily distinguished. The teleutospores are similar, but those on cowpea have slightly

thinner walls and less apical thickening; they germinate immediately and those of the bean rust germinate only after a long ripening period. Drawings of spores of both species are reproduced for comparison.

Fig. 17.—*Uromyces appendiculatus*. Teleuto- and uredo-spores.

These differences, with the exception of those observed in the germination of the teleutospores, for which fresh material would have been necessary, were found in the South African rusts on *Vigna* and *Dolichos*.

The aecidium (Rh. 2232, 2249, 1849) differs little from the diagnosis given by Fromme; Nos. Rh. 2232 and 2233 (Teleuto- and aecidia) were collected from separate plants growing within a few yards of each other. It seems probable that they are stages in the same rust. This aecidium seems to differ from *Aecidium Vignae* Cooke and has not been found in the Union.

I am indebted to Dr. Hopkins for the opportunity of examining the Rhodesian specimens quoted, and for material of several other Rhodesian rusts described in this paper.

Uropyxis Gerstneri Doidge nov. spec.

Teleutosori plerumque hypophylli, pauci aggregati, deinde greges irregulares majores usque 5 mm. metientes formans, minuti, mox nudi et pulverulenti, epidermide lacerata cincti, atro-brunnei. Teleutosporae castaneo-brunneae, oblongae, utrinque late rotundatae, haud incrassatae, septo verticali praeditae, medio vix constrictae, 25–32 × 19–25 μ, episporio 1·5–2 μ crasso, superficie aculeis subhyalinis v. brunneolis ad apicem 2–3 dentatis rarius simplicibus, 1·5–2 μ interdum usque 4 μ longis, densiuscule et irregulariter obsitis; poris germinationis binis in quoque loculo praeditis; pedicello leniter colorato persistenti, 25–60 μ longo ad apicem 4–5 μ crasso, inferne inflato, ca. 7·5 μ crasso.

Hab. in foliis *Annonaceae* indet., False Bay, Zululand, leg. Gerstner, 34564.

Sori mostly hypophyllous, at first single or in small, close groups; later forming larger, more loosely connected, irregularly radiating groups up to 5 mm. diam. Single sori dark brown, minute, more or less circular in outline, 0·2–0·5 mm. diam., sometimes coalescing to form larger sori, surrounded by the torn epidermis, becoming loosely pulverulent. On the upper side of the leaf there is a depression in the leaf tissues above each sorus and thus are etched in the leaf surface irregularly radiating, branching lines: the leaf tissues are somewhat discoloured but there are no definite leaf spots. Occasionally a few sori develop on the upper side of the leaf, opposite those on the lower surface.

Teleutospores chestnut-brown, 2-celled, oblong, very broadly rounded at both ends, barely constricted at the septum, which is usually vertical, rarely oblique and only very occasionally transverse, rarely somewhat irregular in form and asymmetrical through

mutual pressure, 25–32 × 19–25 μ, mostly 25 × 20 μ. Epispore 1·5–2 μ thick, rather uneven in thickness but not thickened at the apex, bearing numerous aculeae, irregularly placed, but usually more numerous on the side remote from the pedicel. Aculeae hyaline or slightly tinted, 2–2·5 μ or occasionally up to 4 μ long, sometimes tapering from a base about 1 μ broad to a simple, obtuse apex; most frequently 2–3 dentate at the apex, or with spreading branches up to 1 μ long. Germ pores 2 in each cell. Pedicel slightly tinted, 25–60 μ long; upper portion smooth, thick-walled, 4–5 μ thick, the lower part inflated and somewhat club-shaped, ca. 7·5 μ thick, rough, tuberculate.

on leaves of *Annonaceae* undet., False Bay, Zululand, *Gerstner* 4817, 34564.

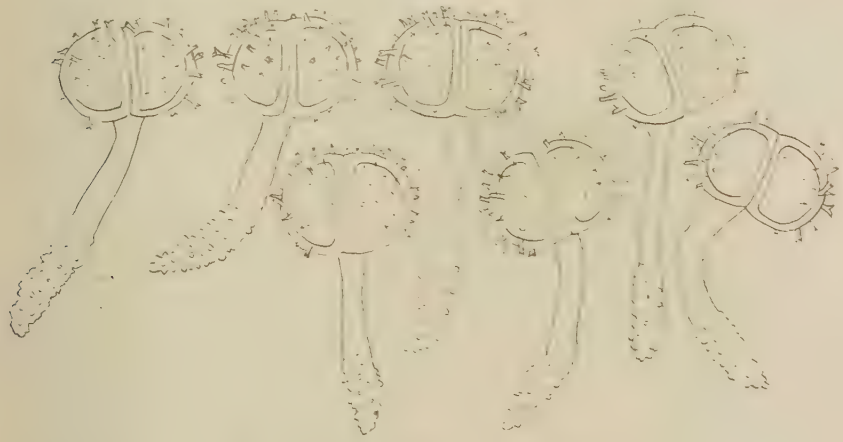


Fig. 18.—*Uropyxis Gerstneri*. Teleutospores.

Uropyxis Steudneri P. Magn.

Ber. Deutsch. Bot. Ges. X (1892) p. 193 and XVII (1899) p. 119.

Dietel in Engl. and Prantl. Die naturlich. Pflanzenfam., 2 Aufl. (1928) Bd. 6. p. 65.

Diorchidium Steudneri P. Magnus, Ber. Deutsch. Bot. Ges. IX (1891) p. 91. Taf. V.

Puccinia Steudneri (P. Magn.) Dietel, Prings. Jahrb. XXVI (1894) p. 81, Taf. XIV, Fig. 2. Syd. Monogr. Ured. I (1904) p. 841, Tab. XLIV, F. 562.

Var. **rhodesica** Doidge nov. var.

A typo differt teleutosporis majoribus, 50–65 × 37·5–45 μ, septo plerumque horizontali et tegumento pallide fusco.

Hab. in foliis petiolisque *Ormocarpi trichocarpi*, Inyati, leg. Hopkins (Rh. 5990)

Spermogonia epiphyllous, opposite the hypophyllous teleuto-sori, in small groups, sometimes surrounded by teleuto-sori, honey-yellow, lenticular, ca. 150–200 μ diam.

Teleuto-sori amphigenous and petiolicolous, but most frequent and extensive on the lower surface of the leaf; from about 0·5 mm. diam., varying in size and often covering the whole under surface of the leaflet, up to 3 × 1·5 mm., or on petioles becoming elongated up to 3 mm. long and 0·5 mm. broad, dark brown, firm, pulvinate, early becoming naked, surrounded by the torn epidermis. Teleutospores broadly elliptical, broadly rounded at both ends, not constricted at the septum, 50–65 × 37·5–45 μ (when dry, 45–60 × 30–37·5 μ). Wall laminate, minutely or rather distinctly verrucose; verrucae ca. 1–1·5 μ long, obtusely conical and irregularly placed, about 3–5 μ distant from one another; inner layer chestnut-brown, 2·5–4 μ thick, outer pale fuscous, swelling when wet to a thickness of 4–7·5 μ, but mostly 5 μ thick; septum horizontal (ca. 50 per cent.), oblique (ca. 36 per cent.) or vertical

(ca. 14 per cent.); germ pores lateral, two in each cell. Pedicel persistent, up to 180 μ long, hyaline, 6-9 μ broad; at first cylindrical throughout, when spores are mature, swelling just below the spore into a globose vesicle 20–25 μ diam.; this bursts in water, setting free the spore.

on leaflets and petiole of *Ormocarpum trichocarpum* (Taub.) Harms, Inyati, S. Rhodesia June 1943, *J. C. Hopkins* (Rh. 5990).

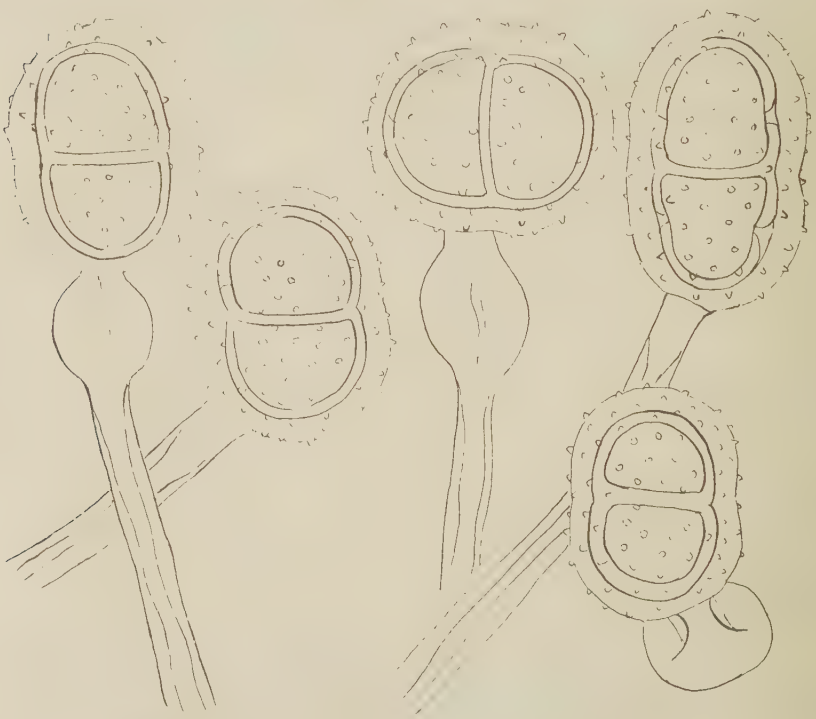


Fig. 19.—*Uropyxis Steudneri* var. *rhodesica*. Teleutospores.

The type was described by Magnus (1891 l.c.) as *Diorchidium Steudneri* on *Ormocarpum bibrachiatum* Bkr. from Abyssinia; later he transferred this rust to the genus *Uropyxis*. He gave the average measurements of the teleutospores as 44·4 × 36 μ; *fide* Sydow l.c., the limits of size are 40–52 × 35–40 μ. In the type the septum is usually vertical as in the genus *Diorchidium* and the outer envelope of the spore hyaline.

The variety differs in the consistently larger spores, predominantly horizontal or oblique septum and pale, fuscous outer envelope.

SOUTH AFRICAN RUST FUNGI.

By E. M. Doidge.

Part VI.

THE SPECIES OF UROMYCES ON IRIDACEAE.

In Sydow's Monographia Uredinearum (Vol. II, 1910, p. 251), it is stated that of the 18 species of *Uromyces* known to occur in genera of the family Iridaceae, only one occurs in Europe, two in America and the remaining 15 species in Central and South Africa. The African species are closely related to one another, differing only in a number of small points such as the presence or absence of paraphyses in the sori, the size of the uredospores and the form and colour of the teleutospores, including the thickness of the wall, which is usually more or less thickened at the apex.

Fourteen of the 15 African species mentioned in the Monograph were recorded from South Africa, and since 1910, five more species have been described on hosts belonging to the Iridaceae in this country.

Several of the earlier species were described from a single collection and often from sparse material. When abundant material is available, some of the minor differences regarded as specific distinctions are found to fall away, as the spore characters are more variable than at first supposed. For example, *Uromyces Melasphaerulae* Syd. is said to be distinguished by its regularly spherical teleutospores; actually the teleutospores, although predominantly globose, vary considerably in form and may also be oblong or ovate with bluntly conical or truncate apices.

There has also been a tendency to describe as new, rusts found on host genera on which no species of *Uromyces* had been recorded. An imperfect knowledge of the nomenclature of South African plants has then led to a further multiplication of species. *Uromyces Zeyheri* Bubak is described on *Ixia scillaris*; this is the same plant as *Tritonia scillaris*, the host of the type of *Uromyces bona-spei*. There is no significant difference in the descriptions of the two *Uromyces* species.

It is evident that a critical comparative study of the South African species of *Uromyces* occurring in Iridaceae is desirable, now that more extensive collections have been made. In the Cryptogamic Herbarium, Pretoria, there is abundant material of several species, and I am indebted to the Director of the South African Museum, Cape Town, and to my colleagues in the phanerogamic section of the National Herbarium, Pretoria, for allowing me to examine a number of specimens on which rust pustules were found.

In studying this group of *Uromyces* species, it has been found that the form of the sorus is characteristic. The presence or absence of paraphyses and the depth of the sorus, including the number of rows in which the spores are arranged, are remarkably constant characters; they are of considerable diagnostic value, in view of the very slight variations in the size and form of the spores.

No fresh collections have been made of *Uromyces Sparaxidis* Syd. [Ann. Myc. 2 (1904) p. 27 and Monogr. Ured. II (1910) p. 257] which was described from material collected by Medley Wood in Natal; the collector's number is not quoted. In Bothalia II (1927) p. 31, a rust on *Dierama pendulum* (=*Sparaxis pendula*) collected by Medley Wood, was assigned to this species; so far as can be judged by the description of the spore characters, this is incorrect; it is not stated whether paraphyses are present in the teleuto-sori or not. There is also some doubt about the identity of the host plant. The type is said to be on *Sparaxis lineata* collected in Natal by Medley Wood. *Sp. lineata* is a plant occurring only in the winter rainfall area of the Cape and is not found in Natal. No authentic material of the species has been available for study, it has therefore not been possible to include it in the key, or to compare it with other South African species.

The remaining 18 species have been studied, and it is considered that only 10 can be regarded as distinct species; these have been re-described and figured. A further two species have been described.

KEY TO THE SPECIES.

A.—No paraphyses in the teleuto-sori.

(*a*) Teleutospores not thickened at the apex or only slightly so (up to 4 μ)... 1. *U. Moraeae.*

(*b*) Teleutospores thickend at the apex (4–10 μ).

1. Teleuto-sori long remaining covered, shallow, not more than 100 μ deep, spores in ca. 3 rows.

x. Uredospore 16–25 × 15–19 μ, wall 1 μ thick..... 2. *U. Ec'lonii.*

xx. Uredospore 20–27 × 20–24 μ, wall 2 μ thick..... 3. *U. Zeyheri.*

xxx. Uredospore 17 24 × 15–20 μ, wall 2·5–3 μ thick..... 4. *U. Ixiae.*

2. Teleuto-sori becoming naked comparatively early, sori compact, pulvinate, 100–150 μ deep, spores in 5–7 rows..... 5. *U. Gladioli.*

B.—Individual teleuto-sori surrounded by paraphyses.

(*a*) Paraphyses very freely developed and often continuous and palisade-like between distant sori..... 6. *U. kentaniensis.*

(*b*) Paraphyses less numerous, usually restricted to a palisade-like envelope round each individual sorus.

1. Teleuto-sori 100–125 μ deep, spores in five closely packed rows?.... 7. *U. Dieramae.*

2. Teleuto-sori 60–80 μ deep, spores in 3–4 rows.

x. Aecidia present.

y. Uredospores 25–30 × 19–22·5 μ, wall 2–2·5 μ thick..... 8. *U. Ferrariae.*

yy. Uredospores 20–24 × 13–20 μ, wall 1·5–1·7 μ thick..... 9. *U. Anomathecae*

xx. Aecidia not present.

y. Uredospore with wall ca. 2 μ thick, finely but conspicuously verruculose-echinulate..... 10. *U. Antholyéae.*

yy. Uredospore with wall 1·5 μ thick, closely and very minutely verruculose.

o. Wall of teleutospore ca. 2–2·5 μ thick, apex thickened 5–9 μ; spore 17–20 μ broad..... 11. *U. Freesiae.*

oo. Wall of teleutospore ca. 2 μ thick, apex thickened 4–6 μ, rarely more; spore 15–17·5 μ broad..... 12. *U. transversaliss.*

1. Uromyces Moraeae Syd.

Sydow, Ann. Myc. X (1912) p. 33, Doidge, Bothalia II (1927) p. 36.

II. Uredo-sori scattered, or numerous and crowded, but rarely confluent, oblong, lying between the veins of the leaf, $\frac{1}{2}$–1 mm. long, ca. $\frac{1}{2}$ mm. broad, at first blister-like, covered by the raised epidermis; the epidermis soon ruptures, revealing the pale yellow-brown spore masses, which are surrounded or partially veiled by the torn epidermis. Uredospores globose or subglobose to ovate, 21–25 × 20–22·5 μ, rarely oblong and up to 32 μ long; epispore thin, delicate, pale golden-brown to subhyaline, 1–1·25 μ thick, very finely and rather closely verruculose echinulate; germ pores 6–8, scattered, small but obvious.

III. Teleuto-sori similar to the uredo-sori but darker. Sorus shallow, the teleutospores usually developing in not more than three rows, usually becoming exposed rather early, subpulverulent; no paraphyses. Teleutospores deep chestnut-brown, globose, subglobose, oblong or ovate, rarely irregular in form; rounded at the apex; rounded at

the base, or, less frequently, tapering somewhat to the pedicel; mostly 22-25 × 17-24 μ (18–28 × 16–24 *fide* Sydow); epispore smooth, 2–2·5 μ thick, not thickened at the apex or slightly thickened (2·5–4 μ); pedicel rather stout, hyaline except at the apex, where it is slightly tinted, persistent, ca. 6 μ thick and up to 50 μ long.

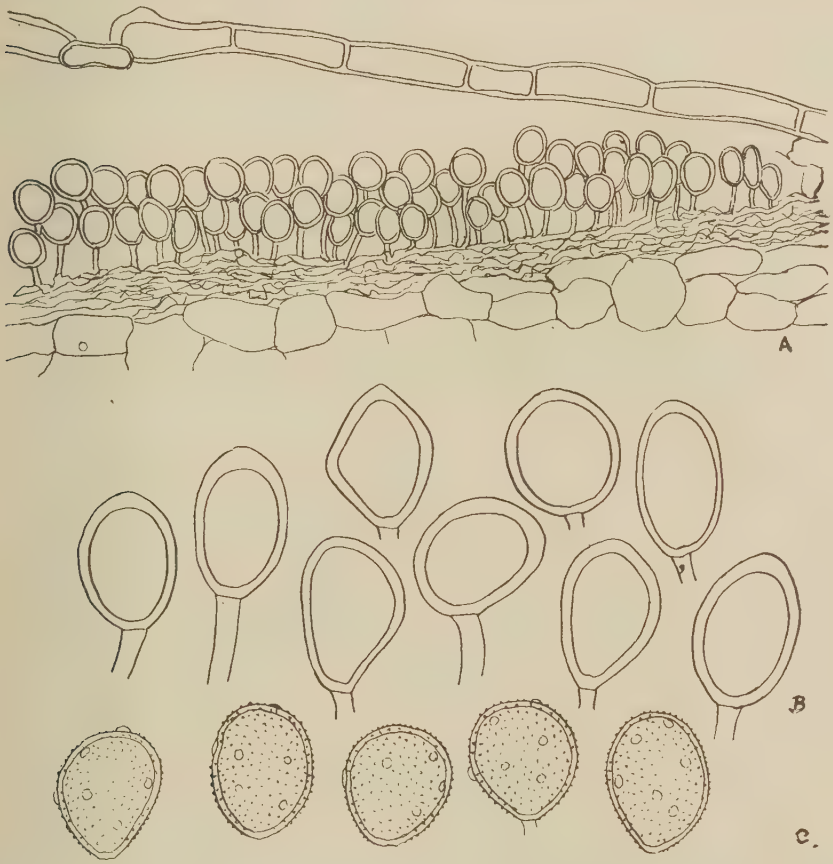


Fig. 1.—*Uromyces Moraeae* Syd.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

n *Moraea spathulata* Klatt., Volksrust, *Weeber*, 773 (Co-type); Melmoth, *Foster*, 11630; Mooi River, *Mogg*, 17036; Hopevale, nr. Donnybrook, *Doidge*, 33438.

2 Uromyces Ecklonii Bubak.

in Sydow, Monogr. Ured. II (1910) p. 253. Doidge, Bothalia II (1927) p. 32.

II. Uredo-sori amphigenous, lying between the veins of the leaf, round to irregular or transversely oblong, up to ca. 0·6 mm. diam., or becoming confluent and larger, early naked, yellow, pulverulent, surrounded by the torn epidermis, which splits longitudinally.

Uredospores ovate or subglobose, pale yellow to subhyaline, 16–25 × 15–19 μ; epispore 1 μ thick, minutely and rather closely verruculose-echinulate; germ pores 6–9, small, obscure.

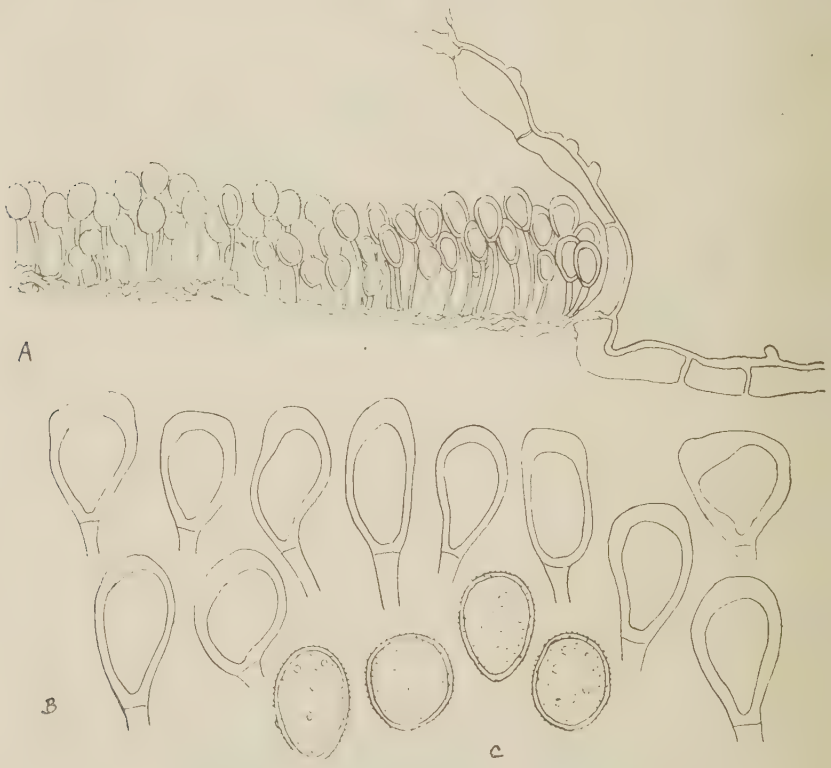


Fig. 2.—*Uromyces Ecklonii* Bubak.
(*a*) Section through sorus.
(*b*) Teleutospores.
(*c*) Uredospores.

III. Teleuto-sori minute, scattered, often interspersed with the uredo-sori, dark brown, round to irregular, up to ca. 0·3 mm. diam., compact, long covered by the epidermis; teleutospores often forming at the margin of a uredo-sorus; sori shallow, spores in not more than three rows. Teleutospores ovate to subglobose, or somewhat irregular and angular through mutual pressure, brown, apex usually rounded, less frequently truncate or obtusely conical, base more or less attenuate, less frequently rounded, 20–32 × 15–20 μ; epispore smooth, 2–2·5 μ thick, slightly thickened (4–8 μ) at the apex. Pedicel persistent, hyaline except at the apex, where it is slightly tinted, ca. 5 μ broad, up to 40 μ long.

on *Freesia* sp., Prospect, nr. Komgha, *Pegler*, 5129; Thornville Junction, Natal, *Slatter*, 23186.

Uromyces Ecklonii was originally described by Bubak on *Freesia odorata*, collected at the Cape by Ecklon and Zeyher. The type has not been available for study, but the collections quoted agree well with the original description. The genus *Freesia* has been revised, and the species of the host plants are not determinable without flowering material; the generic identification, however, presents no difficulty.

3. Uromyces Zeyheri Bubak.

in Sydow, Monogr. Ured. II (1910) p. 255; Doidge, Bothalia II (1927) p. 255.

Uromyces Bona-spei Bubak in Syd. Monogr. Ured. II (1910); Doidge, Bothalia II (1910) p. 37.

II. Uredo-sori amphigenous, scattered or in groups, round to irregular, often in transversely oblong groups and becoming confluent; the epidermis ruptures irregularly and exposes the yellow, pulverulent spore masses; uredospores are sometimes also found in the teleuto-sori. Uredospores globose, subglobose, ovate or oblong, yellow, 20–27 × 18–24 μ; epispore ca. 2 μ thick, very briefly echinulate, with 6–8 scattered germ pores.

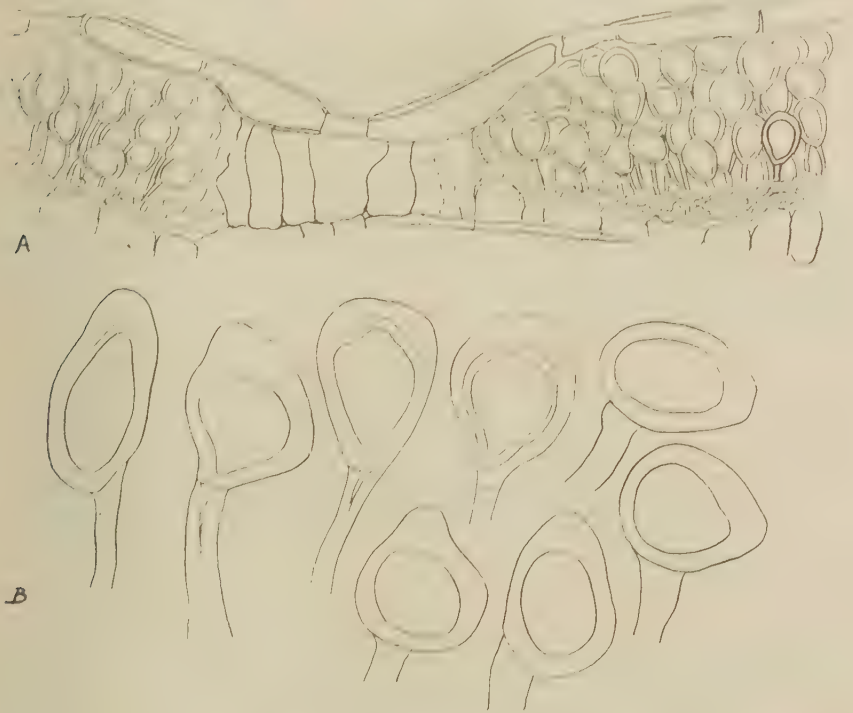


Fig. 3—*Uromyces Zeyheri* Bubak.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.

III. Teleuto-sori amphigenous, minute, more or less circular in outline, 100–300 μ diam., scattered or confluent in oblong, transverse groups, dark brown, compact, long covered by the epidermis, developing under a stoma, 75–100 μ deep; spores closely packed in ca. 3 rows; no paraphyses. Teleutospores globose, ovate or ellipsoid, often irregular and asymmetrical through mutual pressure; apex rounded, conical or truncate, sometimes oblique; base usually rounded, or less frequently tapering somewhat; 24–37·5 × 20–27 μ, mostly 30–35 × 22–24 μ; epispore deep chestnut-brown, smooth, 3–4 μ thick, rarely 2·5 μ, thickened at the apex (5–10 μ); pedicel persistent, tinted brown, especially near the apex, rather stout, 5–7 μ broad and up to 90 μ long.

on *Tritonia scillaris* Bkr. (= *Ixia scillaris*) Houwhoekberg, Cape, *Schlechter 9411* (part of type collection of *U. Zeyheri*) 33296.

Uromyces Zeyheri was described by Bubak as occurring on *Ixia scillaris*, which is the same plant as *Tritonia scillaris*, the type host of *U. Bona-spei*. There is no significant difference in the descriptions of the two species and I think there can be no doubt that they are identical. In the case of *U. Bona-spei* neither locality nor collector is mentioned.

Sydow also mentions *Acidanthera pallida* as a host of the latter species; *Acidanthera pallida* (Ker.) Pax is mentioned as an African plant in Engler and Prantl, Naturl. Pflanzenfam. II. 5 (1887) p. 155; the name is not to be found in any other publication on tropical or South African plants which is available, and it is not known to what plant this name refers.

4. **Uromyces Ixiae** (Lev.) Wint.

Winter in Flora 58 (1884) p. 262; Sydow, Monogr. Ured. II (1910) p. 255; Doidge Bothalia II (1927) p. 34.

?*Uredo Ixiae* Rud., Linnaea 4 (1829) p. 387.

?*Uredo Ixiae* Lev., Ann. Sc. Nat., III Ser., tome 3 (1845), p. 70.

Uromyces Melasphaerulae Syd., Ann. Myc. II (1904) p. 28; Syd. Monogr. Ured. II (1910) p. 256; Doidge, Bothalia II (1927) p. 35.

Uromyces delagoensis Bubak, in Syd. Monogr. Ured. II (1910) p. 255; Doidge Bothalia II (1927) p. 35.

II. Uredo-sori amphigenous, scattered or in groups, minute, round or oblong, yellow or yellow-brown; covered at first by the blistered epidermis which ruptures, and remains partly veiling the sorus. The leaf tissues may be discoloured in the region of the sori, or rather indefinite, round to irregular brown leaf spots may be formed (especially on Melasphaerula). Uredospores yellow or yellow-brown, usually pale, globose or ovate, 18–24 × 17–22 μ; epispore 2·5–3 μ thick, rarely up to 3·5 μ, minutely and closely verruculose; germ pores 6–8, minute, scattered.

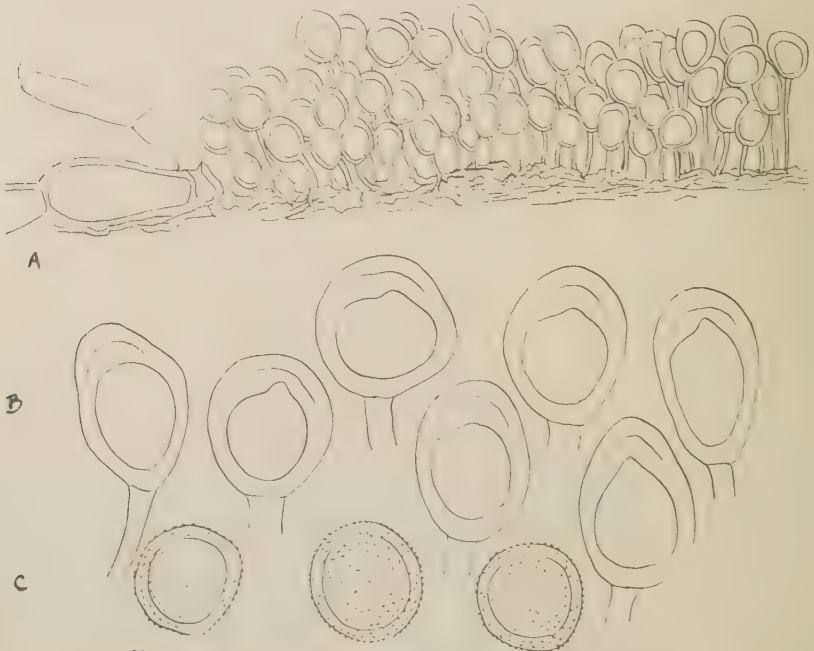


Fig. 4—*Uromyces Ixiae* (Lev.) Wint., on *Lapeyrousia corymbosa*
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

III. Teleuto-sori scattered, or crowded and becoming confluent, more or less round but angular, or oblong, lying between the veins, long covered by the epidermis. Sori comparatively shallow, usually ca. 75 μ deep, rarely up to 100 μ; formed of about three rows of closely packed spores; no paraphyses. Teleutospores chestnut-brown, globose, oblong or ovate, rarely ellipsoid, sometimes slightly angular and irregular through mutual pressure; usually rounded at the apex, less frequently obtusely conical or truncate; base rounded or somewhat attenuate; 22·5–35 μ, rarely up to 40 μ long, 17·5–30 μ broad, mostly 30–35 × 20–25 μ; epispore smooth, mostly 2·5–3 μ thick, less frequently up to 3·5 μ, thickened at the apex, 5–10 μ, rarely up to 12·5 μ; pedicel rather stout, persistent, usually 6–7 μ thick (up to 9 μ *fide* Winter) and 60 μ long, tinted brown throughout or near the apex.

on *Ixia furcata* Ker., Bokkeveld, *Marloth 7659*, 33302.

Ixia leucantha Jacq., St. James, *Pole Evans*, 7736.

Ixia lutea Bkr., Drakenstein Mts., *Galpin 12281*, 33306.

Ixia maculata Thunb., nr. Hopefield, Cape, *Letty*, 33305.

Ixia paniculata Del., Caledon, *Marloth 5939*, 33304.

Ixia patens Ait., Genadendal, *Roser*, 33309.

Ixia scariosa v. *longifolia* Bkr., Bokkeveld, *Marloth 13341*, 33303.

Ixia splendida Lewis, nr. Zebrakop, Piquetberg, *Pillans 7183*, 33307.

Lapeyrousia corymbosa Ker., without locality, *Zeyher 1594*, 33320.

Lapeyrousia delagoensis Bkr., Lolana Beach, Delagoa Bay, *Thodav 169*, 33321.

Melasphaerula graminea Ker., Table Mt., *Ecklon*, 33301; Bredasdorp, *C. A. Smith*, 33308.

Sparaxis bulbifera Ker., Bloemendal, *Zeyher 3968*, 33319.

The first mention of a rust on Ixia is in Linnaea 4 (1829) p. 387, where *Uredo Ixiae* is described by Rudolphi on leaves of *Ixia conica* Salisb. (= *Ixia maculata* Thunb.) from the Cape. "Caeoma maculis subnullis; acervis amphigenis rotundis epidermide rumpente; sporidiis ovatis, medio punctatis, nigris, demum fuscis pedicellatis."

In 1845, Léveillé (Champignons Exotique, in Ann. Sc. Nat. III Sèr. t. 3, p. 70) described a rust on *Ixia* sp. as follows:—

"331. *Uredo Ixiae* nov. sp. Amphigena, acervulis gregariis oblongis nigris epidermide tectis, sporangiis globoso-ellipticis glabris obtusis pedicellis longiusculis. - Hab. ad Cap. Bon. Sp. in foliis *Ixiae* . . . Drège n. 8369.

"Les petites pustules que forme cette espèce sont allongées, parallèles aux fibres des feuilles, et recouvertes presque constamment par l'épiderme; leur couleur est noire; les sporange, à peu près elliptiques, glabres, et supportés par un pédicelle aussi long qu'eux, ressemblent à ceux de *l'Uredo Iridis*; mais dans ce dernier ils sont jaunes."

Winter (Flora 1884, p. 262) drew attention to the fact that according to Léveillé's description *Uredo Ixiae* was a *Uromyces* sp., and considered it identical with a rust on *Ixia* which he had examined. *Uromyces Ixiae* Wint. was described from a rust on *Lapeyrousia corymbosa* and Winter stated that the same fungus occurred on *Ixia* and on *Sparaxis grandiflora*.

Sydow (Monogr. Ured. II 1910, p. 255) does not mention *Lapeyrousia corymbosa*, the type host, but quotes as hosts *Sparaxis grandiflora*, *Acidanthera exscapa* [= *Engysiphon exscapus* (Thunb.) Lewis] and several species of *Ixia*. Of the latter, *Ixia coerulescens* is now known as *Babiana villosa* Ker. and Gaul; the rust on the *Babiana* spp. examined in the course of this study was not *Uromyces Ixiae*. The identity of the *Ixia erecta* mentioned by Sydow is not certain, as the name of the author is not given; *Ixia erecta* Jacq. is *I. lutea* Bkr. and *I. erecta* Berg is *I. polystachya* L.

Uromyces delagoensis Bubak was described on *Lapeyrousia delagoensis* from Mozambique; the description of this species does not differ materially from that of *U. Ixiae*, except in

the thickness of the wall of the uredospore (*fide* Sydow 3–3·5 μ in *U. Ixiae*, 2–2·5 μ in *U. delagoensis* and *U. Melasphaerulae*) ; actually it varies in thickness, even in the same spore ; it is usually 2·5–3 μ thick and occasionally up to 3·5 μ. The rusts on *Lapeyrousia delagoensis* and *Melasphaerula graminea* examined cannot be distinguished from *Uromyces Ixiae*.

Sydow (l.c.) suggests that *U. delagoensis* may be the same as *U. Anomathecae* but he had not seen Medley Wood's collection of this fungus, which has paraphyses in the teleutosori. According to Sydow, *U. Melasphaerulae* is characterised by spherical teleutospores ; in material examined, a considerable proportion of globose spores was seen, but oblong and ovate forms were also present and spores with bluntly conical or truncate apices.

5. **Uromyces Gladioli** P. Henn.

Hedwigia 34 (1895) p. 326 ; Sydow, Monogr. Ured. II (1910) p. 254 : Doidge, Bothalia II (1927) p. 33.

? as *Puccinia Gladioli* Cast. (Fungus stylosporiferus *Uredo Gladioli* Req.) f. *Gladioli Ecklonii* von Thumen, Flora (1875) p. 379.

Uromyces Geissorhizae P. Henn., Hedwigia 39 (1900) p. (153) ; Syd. Monogr. Ured. II (1910) p. 253 ; Doidge, Bothalia II (1927) p. 32.

Uromyces Babianae Doidge, Bothalia II (1927) p. 31.

Uromyces Romouleae v. d. Byl and Werd., Rep. spec. nov. regni veg. 19 (1923) p. 54.

Uromyces Romuleae Doidge, Bothalia II (1927) p. 31.

II. Uredo-sori irregularly round to oblong, scattered between the veins of the leaf, up to 0·5 mm. long, but often in series, becoming confluent, and forming longer striae ; at first covered by the white, blistered epidermis which early ruptures longitudinally, exposing yellow, pulverulent spore masses. Uredospores globose to ovate, pale golden-brown to subhyaline, 20–25 × 17·5–24 μ ; epispore uneven in thickness, 2–3·5 μ thick (mostly 2–3 μ), finely and rather closely verruculose echinulate and with 6–9, small, obscure, scattered germ pores.

III. Teleuto-sori amphigenous, elliptic or oblong, scattered or in series between the veins of the leaf, up to 1 mm. long, or confluent and forming striae up to 2 mm. long ; at first covered by the lead-coloured epidermis, which splits longitudinally rather early, revealing the dark brown spore masses. Sorus without paraphyses, compact, pulvinate, 100–150 μ deep and consisting of 5–7 or even 8 rows of closely packed spores. Teleutospores dark chestnut brown, subglobose, ovate, rarely ellipsoid, or angular and irregular through mutual pressure ; apex mostly rounded, but sometimes truncate or broadly conical ; base usually rounded ; 22·5–35 × 20–25 μ, rarely up to 40 μ long, mostly 25–30 × 20–22·5 μ; epispore smooth, 2·5–3·5 μ or rarely 4 μ thick, thickened at the apex, 6–7·5 μ, less frequently up to 9 μ ; the epispore is more or less distinctly lamellate and there is some indication of an apical pore ;. pedicel stout, persistent, tinted brown, especially near the apex, 5–7 μ broad and up to 75 μ long, occasionally inserted somewhat obliquely.

on *Babiana disticha* Ker., Retreat, *Pole Evans*, 12959 and Kew (type collection of *U. Babianae*).

Babiana stricta Ker., Cold Bokkeveld, *Marloth*, 21014.

Geissorhiza secunda Ker., Vogelgat, western Cape, *Schlechter 9577*, 33300 (part of type collection of *U. Geissorhizae*).

Gladiolus crassifolius Bkr., Ugie, Cape, *Joubert*, 25317.

Gladiolus cuspidatus Jacq., Diep River, Cape, *Marloth*, 9304 ; Kenilworth, *Bolus*, 8466.

?*Gladiolus Ecklonii* Lehm., Bazuja, Kaffraria, *Baur*.

Gladiolus formosus Klatt., Bokkeveld, *Marloth 7561*, 10032.

Gladiolus hirsutus Jacq., Picquetberg, Cape, *Marloth*, 21031.

Gladiolus recurvus L., Kentani, *Pegler 1958*, 8412; Albertina, *Muir*, 8867.

Gladiolus spp., Durban, *v. d. Byl*, 9176; Capetown, 543; Cramond, *Pole Evans*, 6851; Mooi River, *Mogg*, 17037.

Romulea rosea Ecklon, Klapmuts, *v. d. Byl 494*, 10094, 32447 (part of the type collection of *U. Romouleae*).

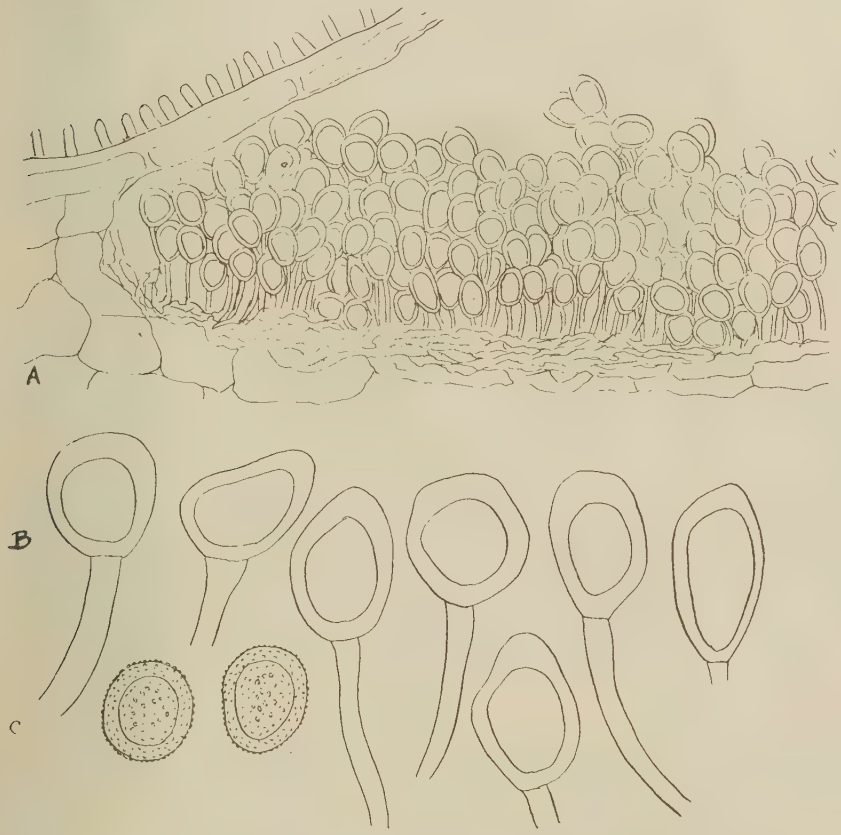


Fig. 5.—*Uromyces Gladioli* P. Henn.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

Uromyces Gladioli was originally described by Hennings (l.c.) on leaves of *Gladiolus angustus* L., collected by Leibold at the Cape. This specimen has not been seen, but, from the description there can be little doubt that this is the rust studied on the several *Gladiolus* spp. enumerated. It is also recorded by Sydow (l.c.) on *Gladiolus blandus* Ait. and *G. orchidiflorus* Andr. from South Africa and *G. Quartinianus* from Kilimandscharo, in tropical Africa.

It seems probable that the rust on *Gladiolus Ecklonii* Lehm. mentioned by von Thümen (l.c.), uredo only, is this species; unfortunately no description is given and this specimen

has not been seen. It seems unlikely that it is *Uromyces transversalis* with which von Thümen was familiar.

Uromyces Geissorhizae P. Henn. was described on leaves of *Geissorhiza* sp. collected at Vogelgat in the western Cape, *Schlechter 9577* ; sori were found on this collection in the phanerogamic herbarium and were studied ; in every particular the sori and spores resemble those of *Uromyces Gladioli*. Type collections of *U. Babianae* Doidge and *U. Romouleae* v. d. Byl were also studied and these rusts found to be identical with *U. Gladioli*.

Sydow has recorded the occurrence of *U. Geissorhizae* on *Geissorhiza rupestris* Schlecht. and *G. secunda* (Berg.) Ker. and also on *Moraea ramosa* Ker. The only *Uromyces* sp. on *Moraea* in the material studied is *Uromyces Moraeae* on *Moraea spathulata* ; no locality or collector is mentioned by Sydow in connection with the fungus on *Moraea ramosa*, and no rust on this host could be traced.

Uromyces Gladioli occurs on a wide range of hosts, many of which are restricted to the south-western Cape and to the coastal area of the eastern Cape and Natal. Nearly all the localities in which it has been found are within 75 miles of the coast, the only exception being Ugie in the Maclear district, which is about 85 miles inland. In collection No. 17037 on *Gladiolus* from Mooi River, Natal, *U. Gladioli* was found in close association with *U. transversalis* ; sori of both species were found in close proximity on the same leaves.

6. **Uromyces kentaniensis** Doidge.

Doidge, Bothalia II (1927) p. 30.

II. Uredo-sori hypophyllous, on rather indefinite, greenish or brownish leaf spots, not numerous, widely scattered, solitary or in small groups of 2–4, rarely more, round or oval, up to $\frac{1}{4}$ mm. diam., surrounded by the torn epidermis. Uredospores ovate or sub-

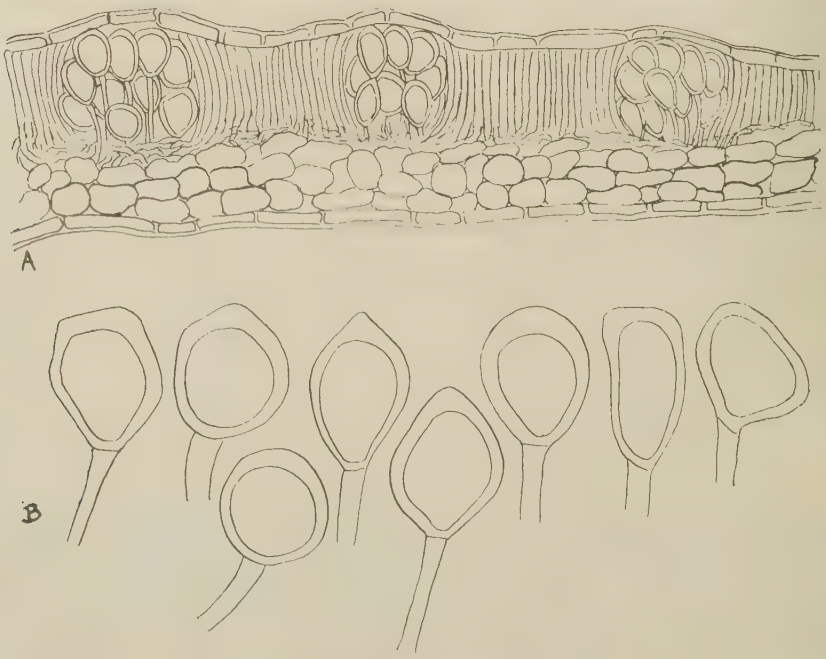


Fig. 6—*Uromyces kentaniensis* Doidge.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.

globose, 19–28 × 17·5–22·5 μ; epispore hyaline, 1–1·5 μ thick, minutely and closely verruculose; germ pores small obscure, several, scattered. A few teleutospores and paraphyses are sometimes to be found in the uredo-sori.

III. Teleuto-sori mostly hypophyllous, only an occasional one on the upper leaf surface, minute, brownish-black, remaining covered by the epidermis; in more or less close groups, often in oblong groups flanking the groups of uredo-sori, above and below; groups of teleuto-sori ca. ½ mm. broad and up to 4 mm. long. Single sori small, 50–75 μ diam., 55 70 μ deep, with spores in three rows; sometimes closely set, sometimes more remote, 10–180 μ apart, the intervening space being filled with golden-brown, palisade-like paraphyses. Teleutospores ovate, ovate-ellipsoid or broadly cuneate; rounded, truncate or obtusely conical at the apex, attenuate, or more rarely rounded at the base; light brown, darker at the apex, 23–24 × 18–27 μ; epispore smooth, thin at the base, ca. 1 μ, becoming gradually thicker towards the apex, usually 1·5–2 μ thick at the sides and 4 μ, rarely 5μ thick at the apex. Pedicel hyaline or slightly tinted, persistent, up to 30 μ long. Paraphyses light golden-brown, firmly agglutinated by their lateral walls, except where they are found with teleutospores in the uredo-sori; up to 50 μ long and about 6 μ thick.

on *Petamenes aethiopica* (L.) Phillips (= *Antholyza aethiopica* L.), Kentani, *Pegler 2381*, 9313.

7. **Uromyces Dieramatis** Doidge nov. spec.

sub *Uromyces Sparaxidis* Syd. in Bothalia II (1927) p. 31.

Uredo-sori amphigeni, sparsi vel aggregati, oblongi v. lineares, minuti v. usque 1 mm. longi, diutius epidermide tecti tandem ea longitudinaliter fissa cincti, ochracei. Uredosporae ovatae v. subglobosae, rarius ellipsoideae v. oblongae, 17·5–25 × 12·5–20 μ, minute denseque verruculoso-echinulatae, membrana hyalina v. subhyalina ca. 1·5 μ crassa, prois germ. 6–9, sparsis. Teleuto-sori amphigeni, singuli minuti, 75 100 μ diam., 100–125 μ alti, epidermide tecti, sed densissime in greges oblongos v. lineares usque 1 mm. longos dispositi et confluentes, paraphysibus periphicis cy lindraceis, subrectis v. leniter curvatis, aureo-brunneis anguste obvallati. Teleuto-sporae brunneae, leves, variabiles, ovatae, oblongae v. cuneatae, haud raro plus minus irregulares subinde e mutua pressione angulatae, apice rotundatae, truncatae v. subconicae, basim versus attenuatae, plerumque 20–30 μ longae et 15–20 μ latae, rarius 35–37·5 μ longae et 10–12·5 μ latae; episporio plerumque 2 μ crasso, raro 1·5 μ vel 2·5 μ, ad apicem crassiore, 5–6 μ, nonnunquam usque 7·5 μ; pedicello usque 40 μ longo, leniter colorato.

Hab. in foliis *Dieramatis penduli*, Cramond, leg. I. B. Pole Evans, 1580.

II. Uredo-sori not on definite leaf spots but often causing some light brown discolouration of the leaf tissues, amphigenous, scattered, or often very numerous and closely crowded, oblong or linear, not transverse, minute or up to 1 mm. long, long covered by the epidermis, which finally ruptures longitudinally and partly exposes the pale yellow spore masses. Uredospores ovate or subglobose, less frequently ellipsoid or oblong, very variable in form and size, 17·5–25 × 12·5–20 μ; epispore hyaline or subhyaline ca. 1·5 μ thick, closely and minutely verruculose-echinulate; germ pores 6–9, small, scattered.

III. Teleuto-sori interspersed with the uredo-sori, darker, remaining covered indefinitely, in closely crowded oblong or linear groups up to 1 mm. long. Single sori rather deep, 75–100 μ diam., 100–125 μ deep, each surrounded by a narrow palisade of pale golden-brown paraphyses. Teleutospores in 5 closely packed rows, often very irregular and angular through mutual pressure, golden-brown to chestnut-brown (the latter in the outer rows) ovate, oblong or cuneate; apex rounded, truncate or broadly conical, sometimes oblique; base attenuate; mostly 20–30 × 15–20 μ, less frequently 35–37·5 μ long and 10–12·5 μ broad; epispore smooth, usually ca. 2½μ thick, rarely 1·5 or 2·5 μ, thickened at the apex 5–6 μ, rarely up to 7·5 μ; pedicel more or less persistent, tinted, especially near the apex, up to 40 μ long and ca. 5 μ broad.

on *Dierama pendulum* Bkr., Cramond, *Pole Evans* 1580, Type, 1451, 2410; Inanda, *Medley Wood 585*, 10475; Durban, McClean, 31030; Bethlehem, O.F.S., *van der Merwe*, 28815.

Dierama pulcherrimum Bkr., Kentani, *Pegler*, 6677, 6924, 7092.

Dierama sp., Nottingham Road, Natal, *McClean*, 32308.

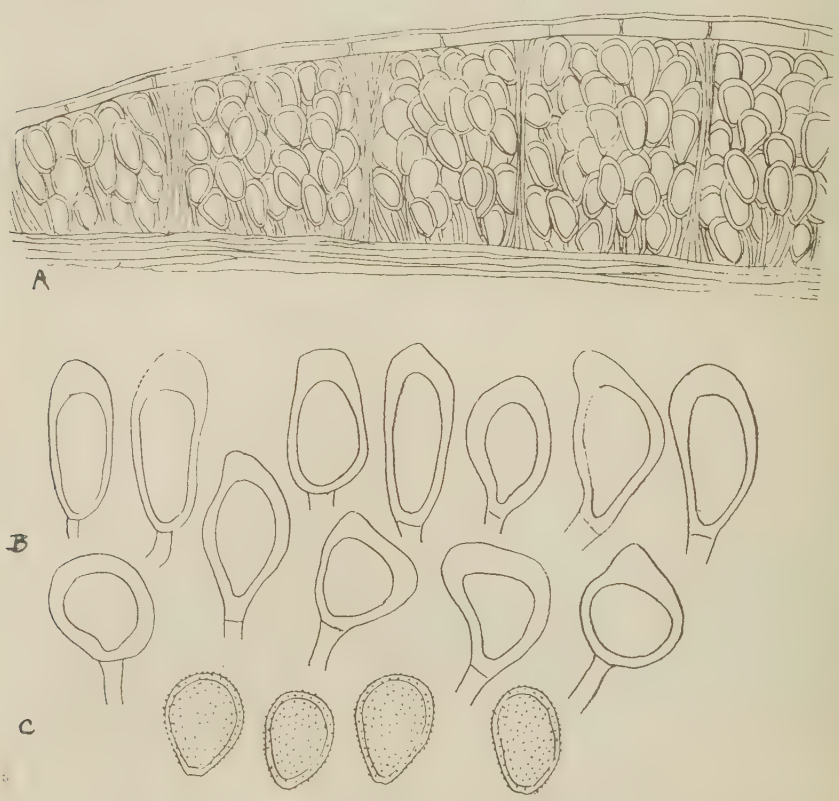


Fig. 7—*Uromyces Dieramae* Doidge.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Urèdospores.

In Bothalia (l.c.) the fungus on *Dierama* was erroneously assigned to *Uromyces Sparaxidis* Syd. The wall of the teleutospore is ca. 2 μ thick, not 1·5 μ as required by the description of *U. Sparaxidis* and there are other minor differences; nothing is said about paraphyses in the description of the above species. The two rusts are closely related, but it is impossible to regard them as identical without an examination of the type of *U. Sparaxidis*. This is said to be "in foliis Sparaxidis lineatae, Natal, J. M. Wood"; unfortunately Medley Wood's number is not quoted. The identity of the host is also open to question, as *Sparaxis lineata* is a species confined to the winter rainfall area of the Cape, and does not occur in Natal.

Teleuto-sori are comparatively rare in most of the collections mentioned, which are rather heavily parasitised by *Darluca filum*; some difficulty was experienced in finding typical sori for study.

8. Uromyces Ferrariae Doidge nov. spec.

Spermogonia plerumque hypophylla, modice copiosa in series ordinata, mellea, 100–130 μ diam. Aecidia hypophylla in greges ellipticos v. irregulares usque 5 mm. longos disposita, cupulata, 200–250 μ diam., margine albido, recurvato, lacerato; cellulae peridii laxe conjunctae, rhomboideae v. polygonales, 17·5–25 × 14–17·5 μ, pariete exteriore striato 5–7 μ crasso, interiore verrucoso 3–4 μ crasso; sporae angulato-globoso, 17–22 μ diam., vel ovatae v. oblongae, 22·5–30 × 12·5 17·5 μ; membrana hyalina, ca. 1·5 μ crassa, dense minuteque verruculosa, Uredo-sori amphigeni, sparsi, minuti vel usque 1 mm. longi, mox nudi, dilute cinnamomei. Uredo-sporae subglobosae v. ovatae, 25–30 × 19–22·5 μ, ubique dense verruculosae; membrana 2–2·5 μ crassa, poris germ. 5–9, sparsis praedita. Teleuto-sori amphigeni, inter uredo-soros sparsi, singuli minuti, 75–135 μ diam., 60–75 μ alti, epidermide tecti, sed densissime in greges oblongos usque 0·5 mm. longos, atros, dispositi et confluentes, paraphysibus periphicis obvallati. Teleutosporae castaneae, leves, plerumque subglobosae, subinde ovatae, obovatae v. cuneatae et e mutua pressione angulatae; apice rotundatae, late subconicae v. truncatae; basi rotundatae v. attenuatae; 22 32·5 × 20–27·5 μ; episporio 1–1·5 μ crasso apice leniter incrassato (usque 7·5 μ); pedicello leniter colorato usque 40 μ longo.

Hab. in foliis et pedunculis *Ferrariae* sp., Chipinga, 33427.

O. Spermogonia mostly hypophyllous, occasionally epiphyllous, near the groups of aecidia, in regularly spaced, longitudinal rows between the veins, rather numerous, honey-yellow, lenticular, 100–130 μ diam.

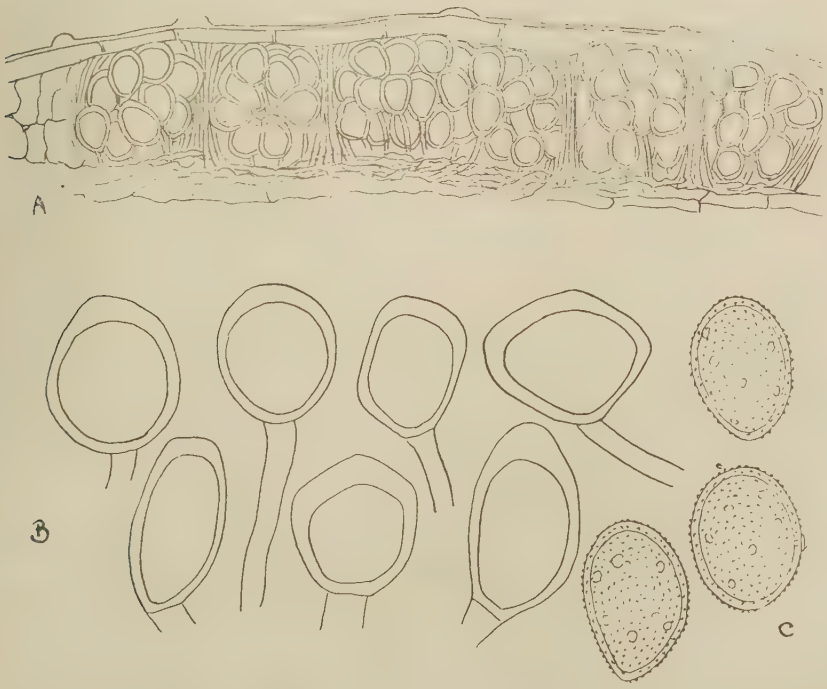


Fig. 8—*Uromyces Ferrariae* Doidge.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

I. Aecidia hypophyllous, in groups which are elliptic or sometimes irregular in outline and up to 5 mm. long, cupulate, 200–250 μ diam., margin white, recurved, laciniate. Cells of the peridium rather loosely connected and readily falling apart, rhomboid or irregularly angular, 17·5–25 × 14–17·5 μ; outer wall striate, 5–7 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose, 17·5–22 μ diam., or ovate to oblong, 22·5–30 × 12·5–17·5 μ; epispore ca. 1·5 μ thick, closely and minutely verruculose.

II. Uredo-sori amphigenous, scattered between the veins of the leaf, elongated (not transverse) minute or up to 1 mm. long; the raised epidermis ruptures longitudinally, early exposing the light brown spore masses. Uredo-spores subglobose to ovate, 25–30 × 19–22·5 μ; epispore closely verruculose, 2–2·5 μ thick; germ pores 5–9, scattered.

III. Teleuto-sori amphigenous, scattered, interspersed with the uredo-sori, oblong, up to $\frac{1}{2}$ mm. long, black, compact, parallel with the veins, not transverse, remaining covered; consisting of a number of individual sori more or less closely crowded. Individual sori 75–135 μ diam., 60–75 μ deep, covered by the epidermis, each surrounded by golden-brown, palisade-like paraphyses. Teleutospores closely packed in 3–4 rows, chestnut-brown, subglobose to ovate, obovate or cuneate, becoming more or less angular through mutual pressure; apex rounded, broadly conical or truncate; base rounded or attenuate; 22·5–32·5 × 20–27·5 μ; epispore smooth, 1–1·5 μ thick, slightly thickened at the apex (up to 7·5 μ). Pedicel persistent, slightly tinted, especially near the apex, 5–6 μ broad and up to 40 μ long.

on *Ferraria* sp., on leaves, spathes and peduncles, Chipinga, S. Rhodesia (Rh. 4298) 33427.

The spermogonia, aecidia, uredo- and teleuto-sori are all to be found on the same leaves, and all in good condition for study, although some of the aecidia were rather old. The teleuto-sori are predominantly hypophyllous, but fairly often develop more or less opposite to one another on each side of the leaf, sometimes they form at the edge of the uredo-sorus.

9. **Uromyces Anomathecae** Cke.

Cooke, Grevillea XIX (1890) p. 6 Sydow, Monogr. Ured. II (1910) p. 256, and Ann. Myc. XX (1922) p. 54, Doidge, Bothalia II (1927) p. 35.

O. Spermogonia amphigenous, not very numerous, interspersed with the aecidia, honey-yellow, 90–100 μ diam.

I. Aecidia amphigenous, in small groups up to 2 mm. diam., not crowded, globose, deeply immersed in the leaf tissue and long remaining covered by the epidermis, finally opening by means of a central pore, pale ochraceous, 150–200 μ diam. Cells of the peridium very loosely connected, irregularly polygonal, occasionally more or less rounded, 20–27·5 × 15–25 μ; outer wall smooth, 5–6 μ thick, inner verrucose, 3–4 μ thick. Spores hyaline or subhyaline, angular-globose, 17·5–22·5 × 15–19 μ, rarely ellipsoid-oblong, 25–27·5 × 13·6–14 μ; epispore 1–1·5 μ thick, closely and very minutely verruculose.

II. Uredo-sori amphigenous, scattered or in loose groups, on brown leaf spots which are elongated in a direction at right angles to the leaf axis. Sori minute, round or oval, up to $\frac{1}{2}$ mm. diam., pale yellow, surrounded by the torn epidermis. Uredospores subglobose or ovate, less frequently ellipsoid, 20–24 × 13–20 μ; epispore hyaline, 1·5–1·7 μ thick, minutely but rather conspicuously verruculose echinulate; germ pores rather obscure, ca. 6–9, small, scattered.

III. Teleuto-sori minute, scattered or in oblong transverse groups, up to 1 mm. long, between the veins; often interspersed with the uredo-sori, but rarely developing round them. Individual sori compact, often developing opposite to one another on either side of the leaf, solitary or in more or less loose groups, but usually discrete, rarely confluent:

remaining covered by the epidermis, mostly 150–250 μ diam. and 50–70 μ deep, with three rows of closely packed spores; surrounded by a narrow palisade of pale golden-brown paraphyses. Teleutospores pale or darker chestnut-brown, oblong, ovate or cuneate, often irregular and angular through mutual pressure; apex broadly rounded, truncate or conical; base attenuate or rounded; 25–35 × 16–24 μ; epispore smooth, ca. 2 μ thick, thickened at the apex (5–9 μ); pedicel light brown, persistent, ca. 5 μ thick and up to 45 μ long.

on *Lapeyrousia cruenta* Bkr., Durban, *Medley Wood 693*, Co-type, 330; Stella Bush, Durban, *Leslie*, 31951; Winkle Spruit, *Doidge*, 2507; Donkerpoort, Pretoria District, *Doidge* and *Bottomley*, 30109.

Lapeyrousia grandiflora Bkr., Wonderboom, *Pole Evans* 443; Durban, 30937.

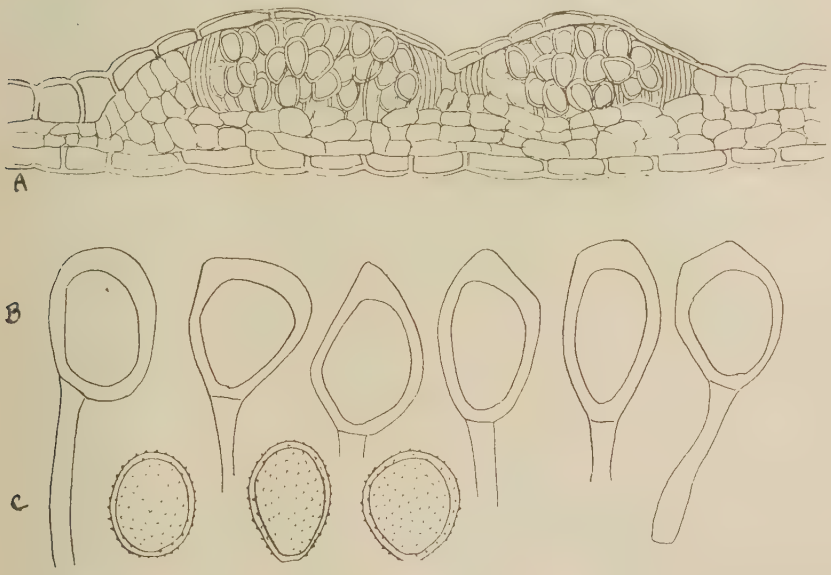


Fig. 9—*Uromyces Anomathecae* Cke., on *Lapeyrousia cruenta* (Medley Wood 693).
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

The aecidium, which has not been previously described, occurs on No. 443, in close association with typical teleuto-sori.

Lapeyrousia cruenta and *L. grandiflora* both belong to the sub-genus *Anomatheca* of the genus *Lapeyrousia*; they are closely related and may even be forms of the same species. *Lapeyrousia corymbosa* and *L. delagoensis* on which *Uromyces Ixiae* is found, belong to the sub-genus *Ovieda* and differ considerably.

10. **Uromyces Antholyzae** Syd.

Sydow, Ann. Myc. II (1904) p. 27 and Monogr. Ured. II (1910) p. 252. Verwoerd, Sc. Bull. 88, Union Dept. Agr. (1929) p. 5. Doidge, Bothalia III (1939) p. 510.

II. Uredo-sori amphigenous, not on leaf spots, but leaf tissues often vaguely discoloured, round or transversely oblong, minute, up to $\frac{1}{2}$ mm. diam., scattered or in transverse series 2–2·5 mm. long, limited in length by the veins; uredo-sori also develop on the peduncle, where they are scattered or in groups, elliptic or irregular in outline and up to 5 mm. long.

At first covered by the blistered epidermis, which finally ruptures, exposing the pale yellow, pulverulent spore masses. Uredospores usually globose or subglobose, less frequently ovate, rarely ellipsoid, 17·5–24 × 15–17·5 μ, mostly 17·5–20 × 17·5 μ; epispore hyaline or subhyaline, mostly 2 μ thick, rarely 1·5 or 2·5 μ, minutely but conspicuously verruculose-echinulate; germ pores small, rather obscure, 6–8, scattered.

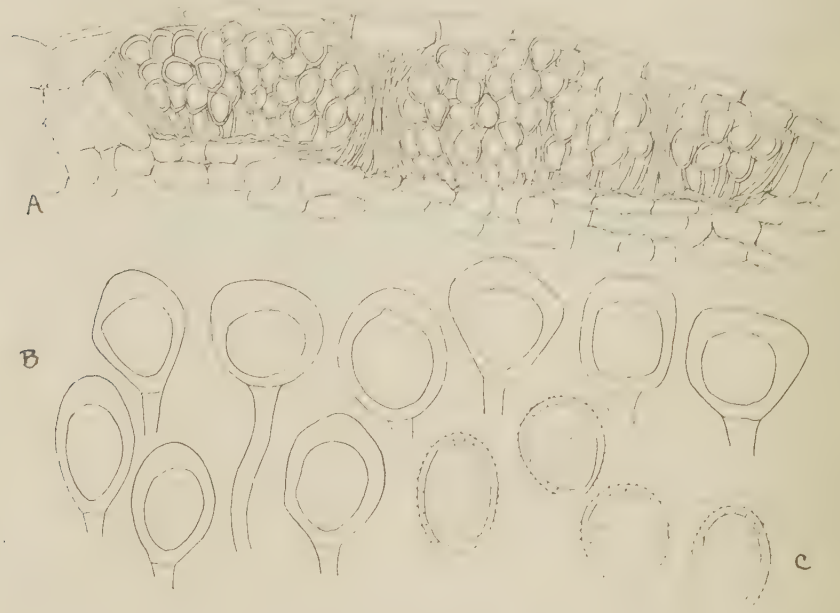


Fig. 10 – *Uromyces Antholyzae* Syd.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

III. Teleuto-sori amphigenous, minute, often developing in the old uredo-sori, similar to the uredo-sori, but dark and remaining covered by the epidermis. Individual sori minute, ca. 100–250 μ diam., 50–75 μ deep, compact, each surrounded by a palisade, up to 10 μ broad, of pale golden-brown paraphyses. Spores usually in 3, sometimes 3–4 rows. Teleutospores chestnut brown, subglobose, globose or oblong, often somewhat irregular through mutual pressure; apex usually broadly rounded or flattened, less frequently obtusely conical; base usually rounded, less frequently attenuate; mostly 20–25 × 15–20 μ, rarely up to 30 μ long and 22 μ broad; epispore smooth, 1·5–2 μ thick, thickened at the apex, 4–7 μ; pedicel persistent, rather stout, light brown, 5–6·5 μ thick and up to 32 μ long.

on *Anapalina revoluta* N. E. Br. (*Antholyza revoluta*), Ruytersbosch, Mossel Bay, *Gemmell* 30085.

Uromyces Antholyzae has also been recorded by Verwoerd (l.c.) from Stellenbosch, Newlands and Knysna. It was originally described by Sydow "in foliis *Antholyzae abyssinicae* in Abyssinia (Schimper)." This host may be *Antholyza abyssinica* Bkr. now known as *Petamenes latifolia* N. E. Br., or *A. abyssinica* Brong, which is the same plant as *Oenostachys abyssinica* N. E. Br.

11. Uromyces Freesiae Bubak.

in Oesterr. Bot. Zeitschr. L. (1900) p. 318. Sydow, Monogr. Ured. II (1910) p. 252. Doidge, Bothalia II (1927) p. 32.

II. Uredo-sori amphigenous, on brown leaf spots, scattered, minute, round or oval, up to $\frac{1}{2}$ mm. long, light brown, surrounded by the torn epidermis, which usually splits in a direction transverse to the leaf axis. Uredospores mostly ovate, less frequently subglobose or ellipsoid, 19–24 × 12·5–17·5 μ, mostly 19–20 × 13–15 μ; episporehy aline, ca. 1·5 μ thick, closely and minutely verruculose, and with 6–9 small, scattered, rather obscure germ pores.

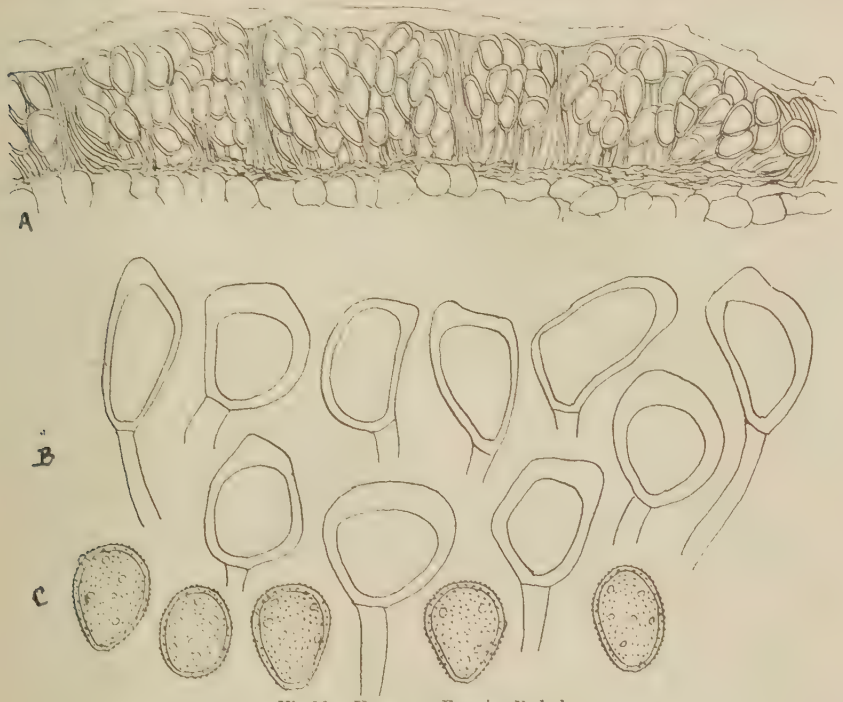


Fig.11—*Uromyces Freesiae* Bubak.
(*a*) Section through teleutosorus.
(*b*) Teleutospores.
(*c*) Uredospores.

III. Teleuto-sori minute, brownish-black, scattered or developing in circles round the uredo-sori, long covered by the epidermis. Individual sori small, up to ca. 100 μ diam., at first distant and each surrounded by a palisade of pale golden-brown paraphyses, often becoming closely crowded and sometimes completely fused; in the latter case the paraphyses are not always distinguishable through the older sections of the sori, but at the margin of the groups of sori, paraphyses are still evident. Sori compact, 60–80 μ deep, with 3–4, mostly 4 closely packed rows of spores. Teleutospores mostly ovate to ellipsoid, occasionally subglobose or clavate, but often very irregular, asymmetrical or angular through mutual pressure; light to deep chestnut-brown, the darker spores in the outer rows of the sorus; apex rounded, truncate or conical; base rounded or attenuate; 20–35 × 15–22 μ, mostly 20–30 × 17–20 μ; epispore smooth, 2·2·5 μ thick, thickened at the apex, 5–9 μ; pedicel subpersistent, hyaline, ca. 5 μ broad at the apex and up to 55 μ long.

on *Freesia* sp., Johannesburg, 17283; Joubertina, Cape *Deysel*, 29714.

According to Sydow (l.c.) paraphyses are to be found among the uredospores; they are clavate, ca. 40 μ long and 9–16 μ broad. This statement was quoted by Doidge (l.c.). In the material examined, no paraphyses were found in the uredo-sori, but the sori were rather old and there were comparatively few spores left in position.

The genus *Freesia* has been revised and it cannot be said whether the host of the above collections is the plant now known as *Freesia refracta*. The type was "in foliis *Freesiae odoratae* in Promontorio Bonae spei Africa austr. (Zeyher)"; this collection has not been available for study.

12. **Uromyces transversalis** (Thuem.) Wint.

Winter, Flora (1884) p. 263; Sydow, Monogr. Ured. II (1910) p. 257; Doidge, Bothalia II (1927) p. 33.

Uredo transversalis Thuem., Flora (1876) p. 570; Kalchbrenner, Grevillea XI (1882) p. 25.

Uromyces Watsoniae Syd., Monogr. Ured. II (1910) p. 258.

II. Uredo-sori amphigenous, scattered or in groups, which are often oblong, transverse and limited by the larger veins of the leaf, round to oblong or irregular, but typically transversely oblong, sometimes minute up to $\frac{1}{2}$ mm. long, but often longer, up to $1\frac{1}{2}$ mm. long and $\frac{1}{2}$ mm. broad; on all hosts longitudinal sori are also found, $\frac{1}{2}$ mm. to 2 mm. long, but these are more numerous on Watsonia; sori at first covered by the blistered epidermis which finally splits; dehiscence usually transverse, but parallel with the leaf axis in the longitudinal sori and sometimes irregular; the ochraceous spore masses remain partially veiled by the torn epidermis. Uredospores variable in form and size, ovate, ellipsoid or oblong, 14–26 × 13–25 μ; epispore hyaline, typically 1·5 μ thick, rarely up to 2 μ, closely and minutely verruculose; germ pores rather obscure, 6–8, scattered.

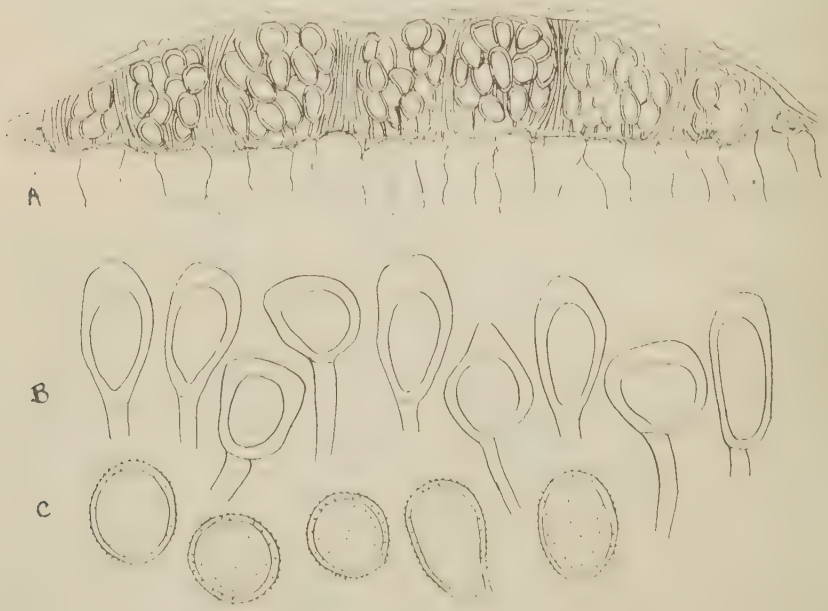


Fig. 12—*Uromyces transversalis* (Thuem.) Wint.
(*a*) Section through teleutosorus on *Tritonia*.
(*b*) Teleutospores from *Tritonia*.
(*c*) Uredospores from *Tritonia*.

Fig. 13—*Uromyces transversalis* (Thuem.) Wint.
Teleutospores from Gladiolus.
Uredospores from Gladiolus.

III. Teleuto-sori minute, black, remaining covered by the epidermis, in small or larger groups, which may be scattered, but not infrequently form an irregular zone round a uredosorus or a group of uredo sori. Single sori small, crowded together, separated only by a zone of golden-brown, palisade-like paraphyses; 50–112·5 μ diam., 55–75 μ deep, with spores in 3–4 closely packed rows. Teleutospores ovate, ellipsoid or pyriform, less frequently globose, often irregular or angular through mutual pressure, light brown, darker often chestnut-brown near the apex; apex rounded, truncate or broadly conical; base usually attenuate, less frequently rounded; 17·5–34 × 14–21 μ, the majority being 20–25 × 15–17·5 μ; epispore smooth, usually ca. 2 μ thick, thickened at the apex, 4–6 μ, rarely up to 8 μ; pedicel subpersistent, hyaline or tinted at the apex, ca. 3 μ thick and up to 45 μ long.

on *Gladiolus psittacinus* Hk., Sydenham, Natal, *Medley Wood* 360.

Gladiolus Saundersii Hk. f., Somerset East, MacOwan.

Gladiolus spp., Port Elizabeth, *Clark*, 26611; Nottingham Road, *McClean*, 32310; Mooi River, Natal, *Mogg*, 10077, 17037; Rosetta, *Mogg*, 11635, 14145; Entumeni, Zululand, *Haygarth*, 14176, 14181; Arcadia, Pretoria, 472; Garstfontein, Pretoria District, *Pienaar*, 1258; Debbe's Ravine, *Bosman*, 29853; Silverton Road, *Doidge*, 29418; Kaalfontein, *Pole Evans*, 10134 and *Mogg*, 11676; Paardeplaats, Lydenburg Distr., *Pienaar*, 1503; Brits, *Sieling*, 30981; Belfast, *Pole Evans*, 10987,

Tritonia lineata Ker., Capetown, *MacOwan*, 4064 (Rabh. Fung. Eur. 3724).

Tritonia securigera Ker., Boschberg, *MacOwan 1254* (Type) 3355, 20780, (Rabh. Fung. Eur. 3014); Uitenhage, *Schmutz*, 25488.

Tritonia sp., Kentani, *Pegler 2435*, 10992.

Watsonia angusta Ker., Kentani, *Pegler 2360, 2379*, 9165, 9192.

Watsonia densiflora Bkr., Belfast, *Doidge*, 552 (co-type of *Uromyces Watsoniae*).

Watsonia meriana Mill., Paddock, Natal, *McClean*, 33322.

Watsonia spp., Sweetwaters, Natal, *Crowden*, 23182; Cana, Basutoland, *Hean*, 32142.

This species is widespread throughout the Union, and is particularly common in the Transvaal, where it causes a serious disease of cultivated Gladioli.

There appears to be no significant difference between *Uromyces Watsoniae* and *U. transversalis*. Sydow states that the wall of the teleutospore is only 1 μ thick in the former species, but in all the specimens examined, including the type collection, it was predominantly 2 μ thick.

DESCRIPTIONS OF SOME NEW HYMENOMYCETES.

By E. M. Wakefield and P. H. B. Talbot.

Asterostromella Rumpiana Talbot, sp. nov.

Fungus resupinatus, late effusus, adnatus, ad 2 mm. crassus. Contextus durus, subero-fibrosus, distincte stratosus, pallide succineus. Hymenium laeve; color ad bubalinum proxime accessit. Basidia clavato-cylindracea, 30 × 4·5 μ, inter hyphae hymeniales dispersa. Sporae elliptico-ovalae, hyalinae, 8·3 × 5·5 μ, subtiliter punctulatae. Gloeocystidia tenue tunicata, immersa, 53–80 × 6·5 μ, intus homogenea. Hyphae crasse tunicatae vel interdum lumene obliterato, hyalinae vel pallide coloratae, ramosae sed non dendroideae, usque ad 3 μ crassae, in 5 per centum KOH fuscescentes. Crystalla multae inter strata adsunt.

Hab. ad lignum in sylvis, Nkandhla, Zululand, leg. W. G. Rump (399), 30200.

Named in honour of Mr. W. G. Rump of the Natal Museum, who by his energetic collecting has greatly advanced our knowledge of South African Hymenomycetes. Type in Kew Herbarium, with isotype in Pretoria.

In structure this species comes close to *Stereum duriusculum* B. & Br. from which it differs in having a darker hymenium and context colour, a different spore size and shape, and smoother contents to its gloeocystidia. (Further discussion on the structure of *S. duriusculum* will be published at a later date in this journal, in which it will be pointed out that this species possesses gloeocystidia and might profitably be considered, with *Corticium portentosum* B. & C. as well, as an Asterostromella).

Coniophora papillosa Talbot, sp. nov. [Fig. 1.]

Resupinata, late effusa, non adnata, 500 μ crassa, fragilis, interdum in sicco fissa; hymenio griseo-sepiaceo cum papillis parvis, fertilibus, hemisphaericis, discretis, superficialiter ortis; contexto fusco; basidia rara, emersa, cylindraceo-clavata, hyalina, 25–30 × 4–5 μ, sterigmatibus 2 vel 4, brevibus; sporae multae, in trama positae vel liberae, ovatae vel ellipticae, laeves, flavido-brunneae, 7·5–10 × 4–6 μ, crasse tunicatae; hyphae basales 2 μ crassae congestae ramosae atrobrunneae, hyphis superioribus conglutinatis vel quasi pseudoparenchymaticis.

Hab. ad ligna, Venterspost Gold Mining Co., Ltd.

Resupinate, widely effused, not adnate, 500 μ thick, brittle, cracked occasionally when dry. *Hymenium* dark drab, covered with small, hemispherical, discrete, fertile papillae of superficial origin. Context fuscous. *Basidia* rarely seen, not in palisade, cylindric-clavate with 2 or 4 short sterigmata, hyaline, 25–30 × 4–5 μ, projecting almost their full length above the mass of tissue. *Spores* elliptical or ovate, occasionally subglobose, yellowish-brown, 7·5–10 × 4–6 μ, sometimes with one side flattened, very numerous and embedded in the upper tissues of the trama, hyaline when immature, thick-walled, sometimes guttulate, smooth. *Tissue differentiation*: Basal layers composed of much interwoven, branched, very dark coloured hyphae, 2 μ wide. The remainder of trama composed of lightly coloured to hyaline tissue which is indistinct or in parts almost pseudoparenchymatous, becoming progressively lighter in colour towards the hymenium.

Specimens examined: on timber, Venterspost Gold Mining Co., Ltd., 23/10/42, *Timber Research Lab. 1852*, Type in Kew Herbarium (produces a brown rot in culture); on indigenous wood in swamp bush, Compensation Beach, Natal, *W. G. Rump 393*. 30194.

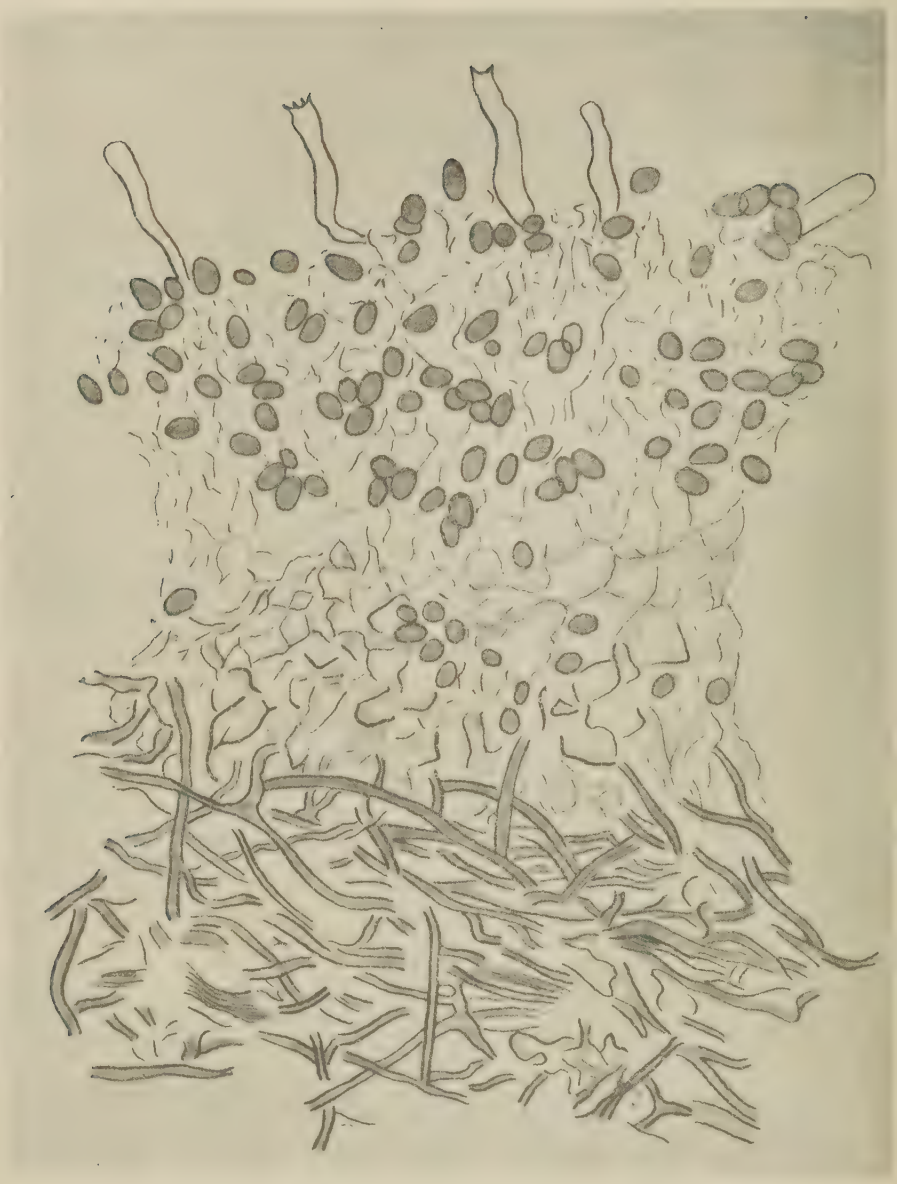


Fig. 1. *Coniophora paj illosa.* X 850.

Corticium gloeosporum Talbot, sp. nov.

Fungus resupinatus, juvenile orbiculatus, demum late effusus, confluens, adnatus, siccitate in aerolas frustulatas diruptus, subiculo candido fibrilloso, contextu cremeo, 200–500 μ crasso. Margo definitus vel radiato-fibrillosus mox liberatus. Hymenium sub-

ceraceum, undulatum vel tuberculatum, sublaeve, cremeum vel pallide incarnato suffusum. Basidia cylindraceo-clavata dense fasciculata, 24–30 × 4–5·5 μ, plerumque basi septato-nodosa. Sporae hyalinae, laeves, obovatae, attenuato-apiculatae, plerumque curvatae, conglutinatae, 5·5–6·5 × 3–4 μ. Cystidiola rara, hyalina, fusiformia, tenue tunicata, interdum uniseptata, 32 × 4 μ. Hyphae subhymeniales plus minus verticales, non distinctae; basales distinctae, ramosae, septatae, frequenter nodoso-septatae, 2–5 μ crassae, dense intertextae, subdecumbentes.

Hab. ad lignum, Town Bush, Pietermaritzburg, leg. W. G. Rump (212) 28288.

Specimens examined: on wood, Town Bush, Pietermaritzburg, *W. G. Rump 212*, 28288 (Type in Kew Herbarium with isotype in Pretoria); on bark, Bulwer, Natal, 1934 *W. G. Rump 26*, 27603.

This specimen corresponds almost exactly with *Corticium laeve* Persoon in external features but is perhaps more areolately cracked and thinner at the margin. Microscopically it differs in having spores and basidia which are considerably smaller. (*C. laeve* basidia 25–40–90 × 4·5–9 μ; spores 7–9–12 × 4·5–7 μ in European specimens). These two species both have similar cystidiola, hyphae and basal clamps on the basidia, while another point of similarity is the highly characteristic pip-shaped, agglutinated form of the spores. *C. laeve* has not yet been recorded from South Africa.

Corticium luteocystidiatum Talbot, sp. nov. [Fig. 2.]

Resupinatum, coriaceum, udo separabile, sicco in areas amplas fissum; margo elevatus et interdum subtiliter dentatus; hymenium ochraceo-salmonicolor vel pallide aurantiacum, laeve vel papillosum vel radiato-rugosum; contextus concoloratus, plus minus 300 μ crassus; basidia clavata, usque 40 μ longa; sporae 9–11·5 × 4–5 μ, hyalinae, laeves, cylindraceae vel ellipsoideae, saepe uno latere plano; gloeocystidia multa, conspicua, praeter regionem subiculi per omnes partes immersa, flavo-oleosa, irregulariter elongata.

Habitat ad ligna, Town Bush, Pietermaritzburg, leg. W. G. Rump, 28307.

Resupinate, not adnate, cracking into large, separated areas; margin lifting on drying, sometimes finely indented, *Hymenium* ochraceous salmon drying to pale orange, almost smooth or papillate or with raduloid ridges. *Context* concolorous, about 300 μ thick. *Basidia* clavate, of variable length, up to 40 μ long. *Spores* 9–11·5 × 4–5 μ, hyaline, smooth, cylindric or ellipsoid with one side depressed or flattened. *Gloeocystidia* numerous, conspicuous, with bright yellow, oily globular content, scattered throughout tissues except next to subiculum, often penetrating hymenium but not projecting beyond, irregular elongated outline, about 60–80 × 6–14 μ.

Specimens examined: Town Bush, Pietermaritzburg, *W. G. Rump 211*, 28307. Type in Kew Herbarium with isotype in Pretoria; Impolweni, Natal, *Rump 167*, 28557; Town Bush, Pietermaritzburg, *Rump 283*, 28690; ? Xumeni Forest, Donnybrook, Natal, *E. M. Doidge*, 28947 (this specimen is badly insect-eaten); ? Town Bush, Pietermaritzburg, *Rump 319 b*, 28679.

Corticium tumulosum Talbot sp. nov. [Fig. 3.]

Resupinatum 60–100 (–200) μ crasso, adnatum, orbiculatum deinde effusum, transverse parallele profunde fissum, contextu ochraceo; margo pallidus, attenuatus, definitus; hymenium tuberculatum, ceraceum, radulatum vel papillosum, radula fusca, caeterum ochraceo-rufulum; crystalla multa in stratibus inferioribus; basidia cylindraceo-clavata, 28–35 × 5·5 μ, sterigmatibus 4, brevibus, curvatis; sporae hyalinae, laeves, late ellipsoideae, 4·5–5·5 × 3–4·2 μ; hyphae distinctae, decumbentes, multiseptatae, 3–4 μ, pallido-fuscae, paucae subhymeniales non coloratae.

Hab. ad lignum, The Willows, Pretoria, leg. K. A. Lansdell, 28897.

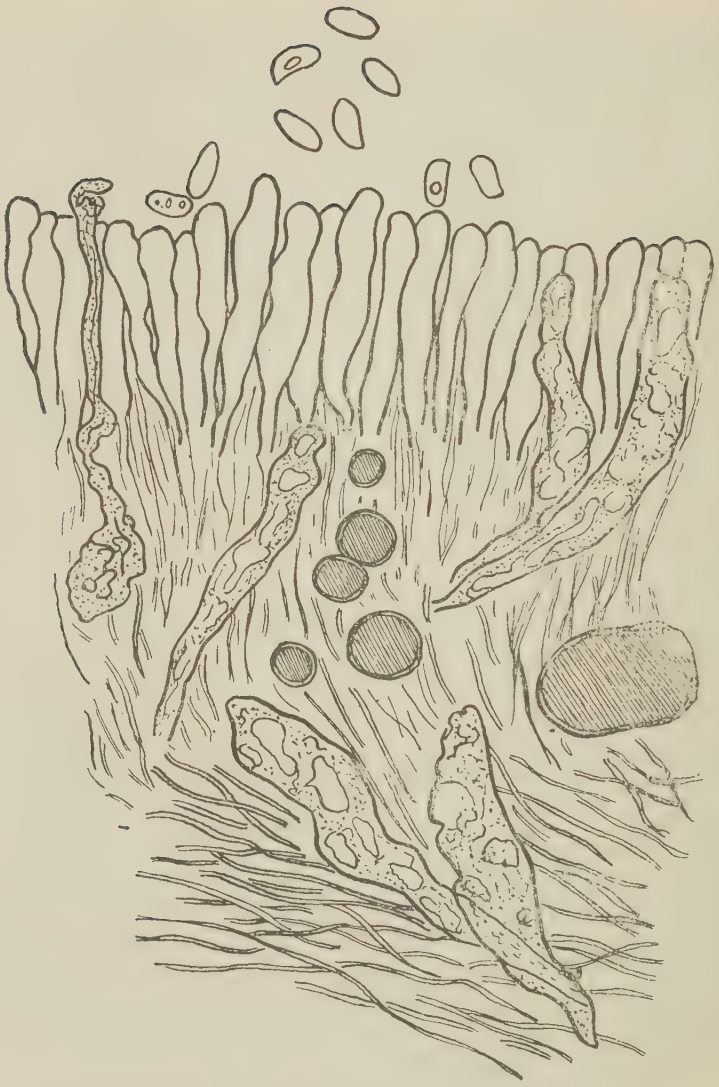


FIG. 2. *Corticium luteocystidiatum*, X 850.

Resupinate, closely adnate, orbicular becoming effused, cracking deeply in one direction, showing dingy yellow context; margin thinning out to a definite pale coloured edge. *Hymenium* tuberculate, waxy, papillate or ridged, raised portions being liver-brown while remainder is reddish-olive; thin in section, 60–100 μ, up to 200 μ including crystals and periderm of host; minerals numerous at base, amorphous or crystalline. *Basidia* cylindric-clavate, 28–35 $\times$ 5·5 μ, with 4 short, curved sterigmata. *Spores* hyaline, smooth, broadly ellipsoid, 4·5–5·5 $\times$ 3–4·2 μ. *Hyphae* distinct, pale yellowish, horizontal, frequently septate, 3–4 μ wide. The few hyphae which are curved abruptly into the hymenium are colourless.

Specimens examined: The Willows, Pretoria District, 27.4.37, *K. A. Lansdell* 28897, Type in Kew Herbarium with isotype in Pretoria.

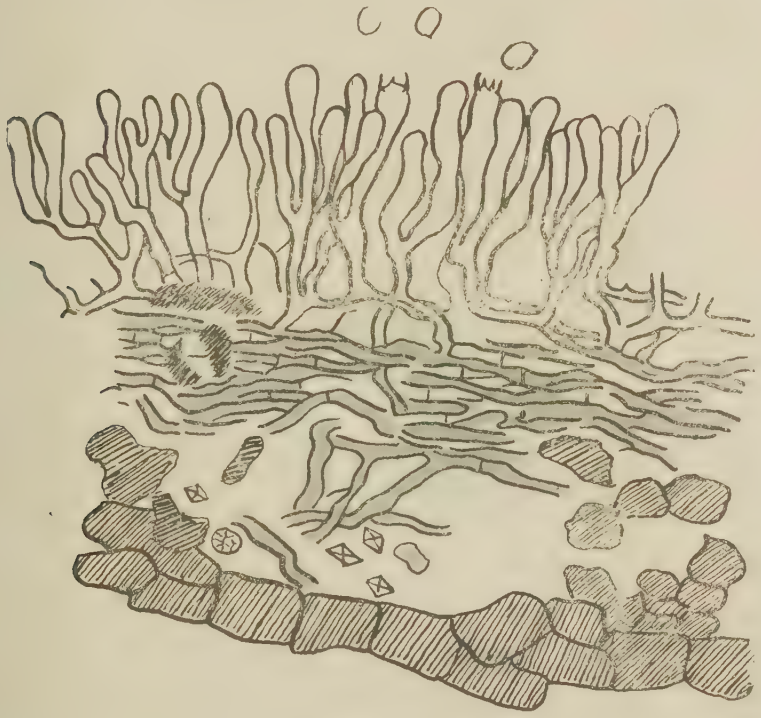


Fig. 3. *Corticium tumulosum* X 800.

Hymenochaete fasciculata Talbot, sp. nov.

Fungus resupinatus, adnatus, siccitate rimosus, fragilis. Hymenium granulosum vel tuberculosum, vinaceo-brunneus (Verona Brown-Ridgway). Contextus 250–400 μ crassus. Basidia et sporae non visae. Setae ad 50 μ emergentiae, vel per totum contextum immersae, castaneae, incrustatae, 70–80–(120) $\times$ 6·6–9 μ, cylindraceo-subulatae, solitariae vel dense fasciculatae. Hyphae flavo-brunneae, 1 μ crassae, plerumque dendritico-ramosae; basales stratum fuscum efformantes.

Hab. ad lignum, Town Bush, Pietermaritzburg, leg. W. G. Rump (220), 28297.

Specimens examined: on wood, Town Bush, Pietermaritzburg, *Rump 220*, 28297, Type in Kew Herbarium, with isotype in Pretoria; Town Bush, Pietermaritzburg, *Rump 262*, Oct. 1934, 28500.

This species falls in a group with *H. corrugata* and *H. fuliginosa* on account of its lacking a non-setigerous hyphal layer, but is distinguished by its setae which are characteristically fasciculate with as many as 8–12 setae per fascicle under the hymenial papillae. The hymenium in No. 28500 is smoother and fasciculation is not so marked, though still present. *H. lictor* Petch (in Ann. Roy. Bot. Gard. Perad. 9 (1925) 277), at one time confused with *H. fuliginosa*, has setae in fascicles (up to 6 per fascicle) but differs from the new species in its smoother reddish hymenium, a lighter context, a light yellow dense basal seam and in possessing cavities in the trama. The hyphae of *H. lictor* are not quite so narrow nor so dendroid as those of *H. fasciculata*.

Hymenochaete ochromarginata Talbot, sp. nov.

Pileus reflexo-dimidiatus, lateraliter connatus, imbricatus, durus, non flexilis, 4 × 2 cms Superficies superior concentrice sulcata, velutinata, sub-badia, tritu ochracea. Hymenium laeve, haud rimosum, castaneum (Argus Brown-Ridgway). Margo acutus, ochraceus, ad 1 mm. latus. Contextus ochraceus, 500–600 μ crassus. Basidia et sporae non visae. Setae ad 20 μ emergentiae vel in strato usque ad 160 μ crasso immersae, subulatae, flavo-brunneae, 1·5 μ diam., dense intertextae, plus minus decumbentes, trama utrinque strato fusco instructa. Tomentum pilei velutinum, hyphis similis.

Hab. ad lignum, Tenadu, Tembuland, legit P. J. Pienaar, 2133.

Specimens examined : Tenadu, Tembuland, 26.2.1912, *P. J. Pienaar*, 2133, Type in Kew Herbarium with isotype in Pretoria ; Cameroons, *T. D. Maitland 93*, Cameroon Mts., 4500 feet, 1930 (in Herb. Kew).

In microscopic structure this species falls in the group with *H. rigidula*, *H. tabacina* and *H. rubiginosa*. There is no likelihood of confusion with *H. tabacina*. *H. rubiginosa* may be distinguished by its longer, narrower setae (50–60 × 5–6 μ), its colliculose, bistre hymenium and wider hyphae (2·5 μ). *H. rigidula* is predominantly resupinate and has darker, wider hyphae (3–4 μ). In Herb. Kew are several specimens from Ceylon under *H. rigidula* B. & C. (No . 3042, 6670, 3866, 6058, 4031) which in micro- and macroscopic characters connect very closely with the new species, differing only slightly in colour. Petch (in Ann. Roy. Bot. Gard. Perad. 9 (1925) 272) gives notes on *H. rigidula* and concludes: " It would seem probable that the Ceylon species is not the same as that from Cuba." (Type from Cuba). With this I concur and would suggest that the Ceylon specimens, quoted above, be placed under *H. ochromarginata*.

Peniophora arenata Talbot, sp. nov. [Fig. 4.]

Resupinata, late effusa, pelliculosa, udo separabilis, sicco fissa, subiculo candido fibrilloso, contextu candido, margine candido plus minus radiato fibrilloso; hymenium subalbidum vel arenatum, farinaceum, subtiliter granulosum ; basidia clavata, 23–30 × 3–5 μ ; sporae 6·5–8 × 2·5–3 μ, cylindraceae, saepe attenuatae et curvatae, laeves ; cystidia immersa raro emergentia, cylindracea, crasse tunicata, dense incrustata, e media trama oriunda, interdum apicibus bifidis, interdum fasciculata, 50–120 × 6–10 μ ; hyphae hyalinae distinctae, crasse tunicatae, sparse nodosae, multiseptatae, interdum granulis incrustatae, 3–6 μ ; hyphis subhymeniales laxe intertextae, plus minus erectae, basales crassiores, dense intertextae, decumbentes.

Hab. ad ligna, Cato Ridge, leg. *W. G. Rump 34*, 27645.

Resupinate, widely effused, pellicular, easily separable when moist, cracking and revealing a whitish fibrillose subiculum, orbicular when young ; context white ; margin whitish, more or less radiately fibrillose. *Hymenium* almost white, light sandy buff, pruinose, farinaceous or finely granular. *Basidia* clavate, 23–30 × 3–5 μ. *Spores* 6·5–8 × 2·5–3 μ, cylindric, usually with one end attenuated and slightly curved, smooth. *Cystidia* immersed, rarely projecting, cylindrical, thick walled, heavily encrusted, attenuated basally into a long, hypha-like cystidiophore originating in mid-trama, sometimes forking briefly at apex, sometimes in closely grouped fascicles, 50–120 × 6–10 μ. *Hyphae* distinct, hyaline, rigid, thick-walled, with very sparse clamp connections, frequently septate, sometimes encrusted, 3–6 μ wide. Basal hyphae dense, horizontal, stouter than those of the subhymenium which are arranged in a loose semivertical layer.

Specimens examined : Cato Ridge, 1934, *W. G. Rump 34*, 27645, Type in Kew Herbarium with isotype in Pretoria ; Xumeni Forest near Donnybrook, 1935, *Morgan* and *Doidge*, 28916 ; The Caverns, Drakensberg 20.7.37, *A. M. Bottomley*, 28891 ; Champagne Castle, Feb. 1945, *W. G. Rump 733*, 35314 ; Boschfontein Kloof, Wolhuterskop, Transvaal, 5.5.39, *Doidge* and *Bottomley*, 33209.

Specific name from arenatus = "mingled with sand"; near *P. leprosa* Bourd. & Galz., which differs in that its cystidia are often emergent and that the basal layers of the trama contain thick-walled, encrusted hyphae in marked contrast to the subhymenial layer of rather indistinct hyphae.

FIG. 4. *Peniophora arenata. Spores, cystidia, hyphae* X 850.

Stereum rimosum Berk. var. **africanum** Talbot nov. var. [Fig. 5.[

A typo facie microscopico non diversum, habitu resupinato-reflexum (nec pileatum vel sessili-umbonatum), tomento crassiore, hymenio rugosiore, magis zonato, pallidiore.

Habitat ad ligna, Karkloof, Natal, Leg. Rump, 30233.

Effused, resupinate-reflexed, sometimes sessile attached by a broad umbo, or composed of several connate, resupinate-umbonate pileoli each roughly circular in outline, coriaceous ; surface cinnamon-buff colour, concentrically furrowed, covered with a thick felty pad-like tomentum ; margin even or lobate. *Hymenium* rimose, showing silky pallid context, often concentrically zoned, warm buff or pinkish-buff, when old becoming darker and more vinaceous colour. *Basidia* closely aggregated, 4·2 μ wide at apex. *Spores* hyaline, smooth, elliptic-ovate with one side frequently depressed and with a small apiculus, 3·5–5·5 × 2–3 μ. *Coloured conducting organs* (indicating a " bleeding " species when fresh) yellow, 5·5–8·5 μ wide, with rigid walls, in a layer about 200 μ wide, distributed in subhymenium

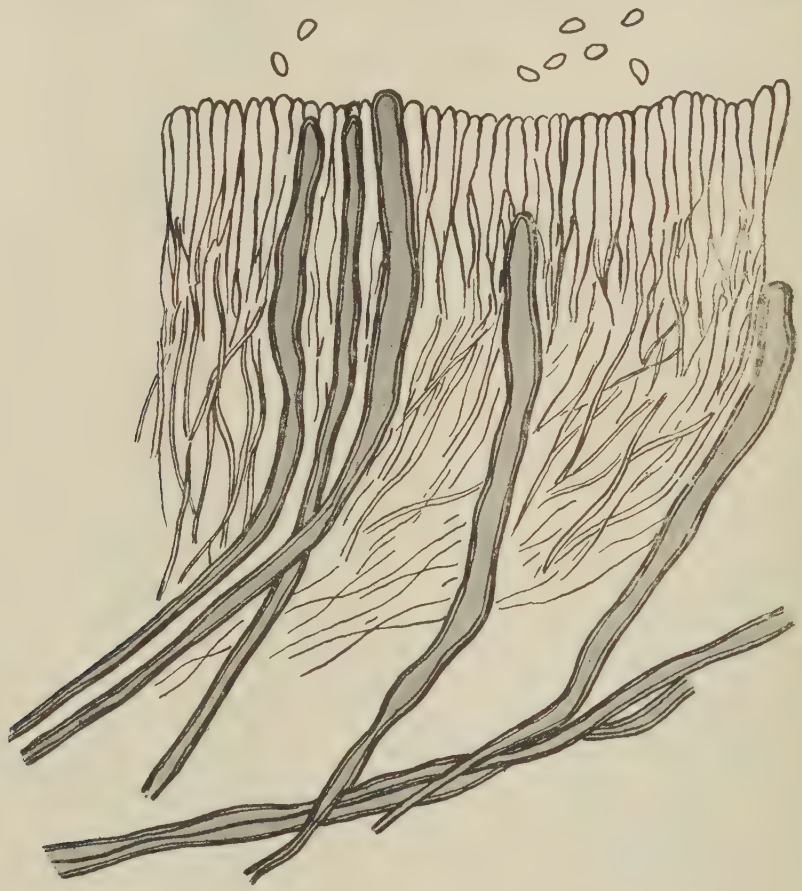


Fig. 5. *Stereum rimosum var. africanum,* X 850.

and curving upwards into the hymenium, immersed. *Hyphae* thin-walled, hyaline, often septate, 3·5 μ wide ; width in section excluding tomentum—700–1,000 μ. Trama bordered next to the tomentum by a narrow orange-coloured zone. Surface hairs thick-walled, very much tangled, 4·2 μ, almost hyaline to pale yellowish.

Specimens examined : Karkloof, Natal, *W. G. Rump 486*, 30233, Type in Kew Herbarium with isotype in Pretoria ; Donnybrook, Natal, 1936, *Morgan* and *Doidge*, 30268 ; Entabene, Louis Trichardt, 24.8.38, *H. C. Bower*, 30777 ; Town Bush, Pietermaritz-

burg, *W. G. Rump 205*, 28285; Houtboschberg, "Tropic of Capricorn, South-East Africa", *W. Nelson 452*, Aug. 1880, in Kew Herb. under *Stereum rugosum*; Uganda, 1915, *T. D. Maitland 19 A*, 1919; *T. D. Maitland 460*.

Compared with Berkeley's type of the species in Kew Herbarium Massee (Journ. Linn. Soc. Bot. 27, 1890 : 187) quotes the spores of the species as "globose, 6-7 μ diam." I was unable to confirm the presence of such basidiospores though there were numerous globose hyphomycete spores, 4-6·5 μ, echinate, faintly coloured, which were conclusively traced to conidiophores of an *Aspergillus* sp. Should basidiospores of the sort described by Massee be demonstrated, the new variety *africanum* will require to be raised to specific rank. The species and the variety are otherwise identical in microscopic characters. They differ in that the species is more or less pileate or umbonate sessile, while the variety is more resupinate-reflexed and has a far thicker tomentum, and a rougher, more markedly zoned hymenium of lighter colour than the species.

Grandinia bicolor Talbot sp. nov. [Fig. 6.]

Resupinata, effusa, a substrato separabilis, sicca parum fissa; margo siccitate elevatus, definitus, subfuscus, subhirsutus; hymenium pallido-chlorosum, dentibus curtis hemisphaericis vel acutis; contextus coloratus "Prout's Brown"; basidia hyalina, cylindraceo-clavata, 14–17 × 4·5 μ; sporae hyalinae, laeves, elliptico-cylindraceae, plerumque uno latere plano vel depresso, 7–8·5 (–10) × 2·8–3·5 μ; hyphae atrobrunneae, crasse tunicatae, 3 μ, basales dense, superiores laxe intertextae; paraphyses pauci ramosi in apicibus dentium interdum adsunt; in trama crystalla mineralia.

Hab. ad ligna, Town Bush, Pietermaritzburg, leg. W. G. Rump, 27756.

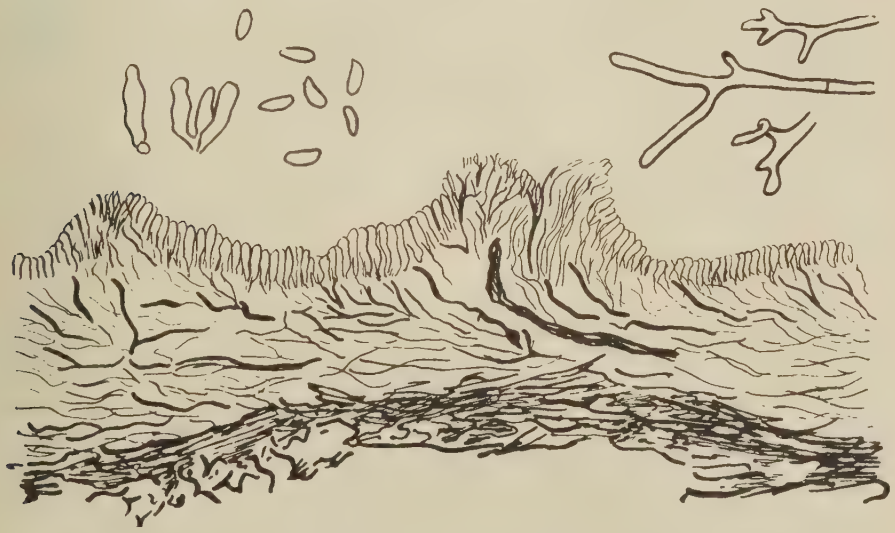


Fig. 6. *Grandinia bicolor. Basidia and spores* X 70, *Paraphyses* X 700, *Section* X 125.

Resupinate, effused, cracking but little on drying, separable from substratum; margin lifting on drying, determinate, light brown, pubescent. *Hymenium* spread over short, densely crowded, hemi-spherical or pointed spines, pallid with a greenish-yellow tint; context Prout's Brown in colour. *Basidia* hyaline, cylindric-clavate, 14–17 × 4–5 μ.

Spores hyaline, smooth, elliptic-cylindric, usually with one side depressed, 7–8·5 (–10) × 2·8–3·5 μ. *Hyphae* dark brown, thick-walled, 3 μ wide, densely packed adjacent to substratum, extending in a looser horizontal network in the mid-trama and sweeping up vertically into the hymenium; occasionally several hyphae aggregate into a thick cord in the trama. A few branched paraphyses sometimes present at the spines. Mineral crystals are present in trama.

Specimens examined: Town Bush, Pietermaritzburg, *W. G. Rump 100*, 27756, Type in Kew Herbarium with isotype in Pretoria; from type locality, *Rump 270*, 28502; *Rump 215*, 28291; *Rump 217*, 28292.

Amauroderma fuscoporia Wakef., sp. nov.

Fungus stipitatus, sicco rigidus. Pileus orbicularis, 3–6 cm. diam., convexus, centro umbilicatus, fortiter radiato-rugulosus, pallide cinnamomeus, expallens, zonis obscurioribus concentricis ornatus, margine obtuso, incurvato. Contextus fulvus, 2 mm. crassus, ex hyphis flexuosis, flavidis, laxe intertextis, 2–5 μ diam. compositus. Stipes centralis, laevis, cinnamomeus, sicco rugulosus, basi incrassatus, radicatus, 2–2·5 cm. longus, 5–15 mm. latus. Tubuli 2–4 mm. longi, umbrini. Pori c. 4 pro mm., in vivo cinerascentes, sicco atrobrunnei. Sporae ovatae vel late ellipsoideae, laeves, pallidae (10-) 11–13 × 9–10 μ.

Hab. ad terram, Salisbury, Southern Rhodesia, May 1939, leg. J. C. Hopkins, Myc. Herb., S. Rhod. 4441.

Fomes zuluensis Wakef., sp. nov.

Pileus ungulatus, 4·5 cm. longus, 5 cm. latus, postice ad 5·5 cm. elongatus, concentrice zonatus, sulcatus, fuscus, marginem versus spadiceus, minute velutinus, margine rotundato, ferrugineo-fulvo. Tubuli stratosi, fulvidi, 0·5–0·75 cm. longi. Pori minuti, punctiformes, 4–5 pro mm., dissepimentis crassis, cinnamomeis, contextus lignosus, ferrugineo-fulvus. Sporae hyalinae, elongato-ovatae, basi subacutae, 8–10 × 5 μ. Setulae nullae.

Hab. ad lignum, Nkandhla Forest, Zululand, leg. W. G. Rump (374), May 1935, Myc. Herb. Pretoria 30186.

Characterised by the ungulate habit, yellow-brown flesh (Buckthorn Brown-Ridgway) and the large, ovate or pip-shaped hyaline spores.

Polyporus Doidgeae Wakef., sp. nov.

Fungus stipitatus, infundibuliformis. Pileus plus minusve orbicularis, 5–20 cm. diam., centro depresso, primo minute fulvo-velutinus deinde mox glaber, e cinnamomeo rufescens (Ridgway "Fawn", "Cinnamon-rufous", "Cameo Brown"), margine incurvo, undulato vel lobato. Contextus albidus, mollis 0·3–1 cm. crassus, ex hyphis flexuosis, tenuiter tunicatis, mox collapsis, 3–8 μ diam. compositus. Hyphae cuticulae paullo tenuiores, 2–6 μ diam., flexuosae, vix ramosae, horizontales, extremitatis obtusis, breviter ramosis, primo lanuginem teneram superficialem efficientibus, sed mox evanidis. Stipes centralis vel excentricus, e castaneo fuscus, intus albidus, firmus, sursum incrassatus, 3·5–6 × 1–3 cm. Tubuli c. 2 mm. longi, albidi, sicco lignicolores, decurrentes; pori 3–4 pro mm., vel deorsum paulle majores, rotundati vel angulati, interdum elongati, dissepimentis tenuibus laceratis. Sporae ellipticae vel ovatae, hyalinae, laeves, 4–5 × 2·5–3 μ.

Hab. ad lignum Acaciae mollissimae, Hopevale prope Donnybrook, Natal, Feb. 1939, egl. K. E. Morgan, Herb. Myc. Pretoria 30499.

Specimens examined: on stumps of *Acacia mollissima*, Hopevale, near Donnybrook, Polela District, Natal, *K. E. Morgan*, Feb. 1939, 30499 (type); Feb. 1935, 27753; March 1936, 28576; March 1938, 30776.

The species is very close to *Polyporus virgatus* Berk., and was at first referred to that species. The upper surface of the pileus is, however, not virgate. It appears at first to be covered by a thin brownish tomentum formed by the ends of the hyphae, but this soon disappears and the surface is then quite smooth. The structure of the flesh affords a good distinctive character. In *P. virgatus* the flesh of the cap is firm and is made up of two kinds of hyphae, all rather thick-walled and rigid, some very fine, others much wider but emitting short, fine branchlets at intervals. In the present species the hyphae are all of one kind, loosely interwoven and very little branched, very thin-walled and often collapsed; they form a rather soft, spongy flesh, which absorbs water readily and is probably of a watery consistency when fresh.

I. A REVISION OF THE SOUTH AFRICAN SPECIES OF THE GENUS TEPHROSIA PERS.

II. THE SEGREGATION THEREFROM OF THE GENUS OPHRESTIA FORBES.

By Helena M. L. Forbes.

Botanical Station, Durban.

I. THE GENUS TEPHROSIA.

Since the South African species of the genus *Tephrosia* were enumerated by Harvey in "Flora Capensis", Vol. 2 (1860 61), a number of new species has been described by different authors, and unnamed material has accumulated in herbaria. This revision, therefore, was undertaken with the object of collating all the previously published descriptions, and of naming and describing any new species found among the unnamed material.

The genus *Tephrosia* belongs to the subsection *Papilionaceae* of the family *Leguminosae*. It was founded by Persoon in 1807, but, as will be seen by the synonymy, *Tephrosia* was not the first name to be given to this group of plants. Murrill in 1910 stated that "according to the Vienna Botanical Conference, the retained and rejected names for this genus are as follows :—

Retained Name.	*Rejected Names.*
Tephrosia Pers. (1807).....	*Cracca* L. (1753) ;
	Colinel Adans. (1763) ;
	Needhamia Scop. (1777).

In Kew Bulletin, 1935, p. 416, there is the following note :—

> "*Cracca* L. is a nomen rejiciendum *Tephrosia* Pers. being conserved against it. The two are essentially identical, Persoon having transferred to *Tephrosia* all the original species of *Cracca*. It would appear, therefore, that the latter cannot be used under the Rules, but still prevents the use of a later homonym."

The genus is not restricted to South Africa, but occurs throughout the whole of Africa, sub-tropical Australia, America, India and other tropical and semi-tropical parts of the world. It is an extremely variable group, its members ranging from small procumbent plants with tiny insignificant flowers to quite big shrubs with racemes of large mauve-purple flowers. Although the prevailing colour of the flowers varies from a pale pinkish-mauve to rosy or mauve-purple, a few species occur with pale yellow and orange to orange-red flowers. There is one constant and conspicuous character by which the genus may be readily recognised, namely, the close, distinct penninerved venation of the leaflets.

Although it is a large and widely spread group, it is not, as yet, of any economic importance. Some 22 species have been recorded as fish-poison plants, and investigations have been carried out on some of these as to their possible use as insecticides. The principal chemical properties are rotenone, deguelin, tephrosin and toxicarol. Full reports on some of these investigations may be found in Kew Bulletin (1937 and 1940) ; Annals of Applied Biology (1925 ; 1932 and 1934) ; Nature (1936), and Malay Agricultural Journal (1937).

Numerous botanists and travellers have commented on the fish-poison properties of these plants. The four most widely known of these are *T. piscatoria* of India, *T. toxicaria*

of America, *T. Vogelii* of Africa and *T. macropoda* of South Africa. In the case of the first three species the crushed leaves and stems are mainly employed, but in *T. macropoda*, or " iLozane " as the Zulus call it, it is the crushed roots that are used. The method of employment, however, is the same. The crushed material is thrown into a quiet pool or pond, or a part of a river that has been dammed up, and in a short while the stupified fish rise to the surface of the water, and are thus easily collected. The flesh of the fish is not in any way affected and may be eaten with impunity. The fish, when they rise to the surface of the water, are not actually dead, but in a state of stupefaction or " intoxication ", and if, at this stage, they are removed to a pool of fresh water, they will gradually recover. They die, however, if left too long in the treated pool. Writing of *T. Vogelii*, Fairchild stated that men who have waded in streams treated with this plant feel a " kind of deadness " in their legs.

In 1937, R. C. Roarke of the United States Department of Agriculture, published an interesting and comprehensive list of all the literature in which references occur about these plants, either as fish-poisons or insecticides, under the title of " Tephrosia as an Insecticide.—A Review of the Literature." This is not merely a list of publications, but consists of interesting citations from the books as well.

ACKNOWLEDGEMENTS.

I am deeply indebted to Dr. Pole-Evans, formerly Chief of the Division of Plant Industry, for the opportunity afforded me of proceeding to Kew, and to the Director of the Royal Botanic Gardens, Kew, and Keeper of the Herbarium, for the privilege of working at Kew. I have also to thank various members of the Kew Staff for valuable assistance, the Keeper of the Linnaean Herbarium, London, and the Directors of the Natural History Museum, South Kensington ; Fielding Herbarium, Oxford ; Museum National D'Histoire Naturelle, Paris ; Conservatoire Botanique, Geneva ; Botanisches Museum, Zurich ; Naturhistorisches Museum, Vienna ; Botanisches Museum, Berlin-Dahlem, for permission to work in these herbaria. I have also to thank the following herbaria for the loan of their material: National Herbarium, Pretoria ; Albany Museum, Grahamstown ; Bolus Herbarium, Cape Town ; South African Museum, Cape Town ; South African College, Cape Town ; MacGregor Museum, Kimberley ; Grey's University College, Bloemfontein ; Transvaal Museum, Pretoria ; University of Witwatersrand, Johannesburg, and the University of Stellenbosch. My thanks are also due to Professor Dinter for kindly loaning me specimens from his private collection.

ABBREVIATIONS.

The following are the abbreviations used when citing specimens deposited in the various herbaria :—

Albany Museum, Grahamstown	A.M.
Bolus Herbarium, Cape Town	B.H.
Botaniska Museet, Uppsala	U.
Botanisches Museum, Berlin-Dahlem	B.
Botanisches Museum, Zurich	Z.
British Museum (Natural History), London	B.M.
Conservatoire Botanique, Geneva	G.
Dinter's Private Collection	D. Coll.
Fielding Herbarium, Oxford	O.
Grey's University College, Bloemfontein	G.U.C.
McGregor Museum, Kimberley	Kim.

Museum National d'Histoire Naturelle, Paris	Pa.
Natal Herbarium, Durban	N.
National Herbarium, Pretoria	P.
Naturhistorisches Museum, Vienna	V.
Royal Botanic Gardens, Kew	K.
South African Museum, Cape Town	S.A.M.
South African College, Cape Town	S.A.C.
Transvaal Museum, Pretoria	T.M.
University of Stellenbosch	S.
Witwatersrand University, Johannesburg	W.

Tephrosia Pers.

Cracca L. Fl. Zeyl. 139 (1747); Spec. pl. ed. 1 752 (1753); *Erebinthus* Mitch. Acta. Acad. nat. cur. 8 app. 210 (1748); *Colinel* Adans. Fam. 2 (1763); *Needhamia* Scop. Introd. 310 (1777); *Tephrosia* Pers. Synops 11. 328 (1807); *Crafordia* Raf. Specchio. 1. 156 (1814); *Kiesera* Rienw. Sylloge ratisbonn. 2.11 (1828); *Xiphocarpus* C. Presl. Symb. Bot 1, 13. t. 7. (1830); *Apodynomene* E. Mey. Comment. Pl. Afr. Aust. 111 (1835); *Catacline* Edgew. Journ. As. Soc. Bengal 16, 2. 1314. (1847); *Macronyx* Dalz. Hooker Kew Journ. 2, 35 (1805); *Balboa* Liebn. Kjoebenhaven Vid. Meddel. 106 (1856); *Seemannantha* Alef. Bonplandia 10,264 (1862); *Benthamantha* Alef. in Bonplandia 10. 264 (1862).

Undershrubs or herbs, stems erect, ascending or procumbent, simple or branched. *Leaves* simple, digitate or pinnate. *Inflorescence* racemose or 1-2 flowers in axils of leaves, racemes terminal, axillary or leaf-opposed; flowers small to large, pale yellow, orange to orange-red, rosy to deep mauve. *Calyx* teeth subequal or longer than the tube; the lower sometimes longer than the rest, linear-lanceolate to subulate; the two upper lobes connate. *Petals* unguiculate; vexillum generally suborbicular and more or less velvety pubescent without; alae obliquely obovate or oblong, adhering a little to the carina, incurved, obtuse or sub-acute. *Stamens*, upper stamen free to the base or middle; anthers uniform. *Ovary* sessile, usually multiovulate. *Style* upcurved, often flattened, naked or bearded; stigma terminal, naked or penicillate. *Pod* linear, flattened, straight or slightly falcate, or plicate or contorted, continuous or slightly septate within.

KEY TO SECTIONS.

Leaves simple	Section 1.
Leaves palmate or digitate	Section 2.
Leaves pinnate; stipules setaceous, linear to subulate	Section 3.
Leaves pinnate; stipules broadly ovate or cordate	Section 4.

KEY TO SECTION 1.

Flowers in a terminal raceme	A.	
Flowers axillary	B.	
A. Peduncles 1-2-flowered	1.	*marginella.*
Peduncles many-flowered	C.	
C. Leaves subsessile, all simple	2.	*acaciaefolia.*
Leaves petiolate, usually 1–2-jugate, lower occasionally simple	D.	
D. Plant canescent; leaflets oblanceolate, 2–4 cm. long	31.	*griseola.*
Plant not canescent; leaflets linear-lanceolate, 4·7–9 cm. long	39.	*elongata.*
B. Legumes 1-seeded	E.	
Legumes more than 1-seeded	F.	
E. Leaves obcordate, up to 2 cm. long	3.	*sphaerosperma.*
Leaves ovate-lanceolate, up to 5 cm. long	4.	*pseudosphaerosperma.*

F.	Calyx lobes longer than tube	5. *Forbesii.*
	Calyx lobes not longer than tube	G.
G.	Leaves sessile	6. *virgata.*
	Leaves petiolate	H.
H.	Flowers 1–3 together	8. *Pietersii.*
	Flowers solitary	I.
I.	Flowers yellow	9. *gracilenta.*
	Flowers mauve	7. *monophylla.*

1. **T. marginella** H. M. Forbes sp. nov. affinis *T. elongatae* E. Mey. habitu minore gracilioreque foliis simplicibus differt.

Caules ascendentes, simplices vel pauce ramosi, sparse appresse pubescentes, fere 33 cm. alti. *Folia* simplicia, lineari-oblonga, 1·5–10 cm. longa, 0·3 1·2 cm. lata, marginibu. crassis; petioli striati, 1·6–3 cm. longi; stipulae lineari-subulatae, 4–5 mm. longaes. *Pedunculi* terminales, 1-2-flori, 4·5 20 cm. longi. *Flores* usque ad 1 cm. longae; dentes calycis lineari-subulati tubo subaequilongi vel longiores; stylus glaber. *Fructus* linearis. 4·5 cm. longus, 3 mm. latus.

Type specimen, *Flanagan* 2271, in National Herbarium, Pretoria.

Stems ascending, flexuous, simple or branching a little, slender, thinly appressedly pubescent, up to 33 cm. high. *Leaves* simple, linear to linear-lanceolate, 1·5 10 cm. long, 1·2 cm. broad; glabrous above, thinly appressedly pubescent below, mucronate, margins thickened and straw-coloured, petiole striate, channelled above, sparsely pubescent, 0·6 3 cm. long. *Stipules* linear, 4 5 mm. long; pedicels 3 mm. long. *Calyx* –teeth equalling or longer than the tube; linear-subulate. *Style* glabrous. *Legume* linear, thinly pubescent, 4·5 cm. long, 0·3 cm. broad.

Cape.—Cathcart district: Mountain above Toise R. Station, *Flanagan* 2271 (P.) Fort Cunynghame, *Sim* 2681 (P.).

This species is similar to *T. elongata* E. Mey, but is a smaller and more slender plant, and the leaves are always simple.

2. **T. acaciaefolia** Welw. ex Baker in Oliv. Fl. Trop. Afr. 2,106 (1871); Baker Leg. Trop. Afr. 180 (1926); Burtt Davy Fl. Tvaal. 1,379 (1932).
Syn. *Cracca acaciaefolia* O. Ktz., Rev. Gen. Pl. 1.174 (1891); Hiern in Cat. Afr. Pl. Welw. 1.218 (1896); *Tephrosia salicifolia* Schinz in Viertelsjahrschr. Nat. Ges. Zurich 52.425 (1907).

Type: *Welwitsch* 2071, in Herbarium, Kew.

Stems erect, ascending, several usually arising from the rootstock, simple or laxly branched, densely grey or ferruginous downy. *Leaves* unifoliolate, linear to linear-lanceolate, subsessile, mucronate, apex obtuse, glabrous, grey-downy below and midrib usually ferruginous, 2·5–17·5 cm. long, 0·6 1·9 cm. broad. *Stipules* linear setaceous, 2·5 mm. long. *Peduncles* terminal, 7 -36 cm. long, laxly flowered; flowers usually in pairs; pedicels short, downy; bracts setaceous, minute. *Flowers* 1 1·1 cm. long. *Calyx* densely silky without, tube 5 7 mm. in diam., 3 mm. long, lobes subulate, acuminate, shortly and thickly ciliate, unequal, 1·5 3 mm. long. *Vexillum* suborbicular, densely silky without, 0·9–1 cm. long, 8 9 mm. broad; claw 2–3 mm. long. *Ovary* 7 7·5 mm. long, densely silky. *Style* 3 mm. long, somewhat flattened, especially near the base, penicillate at apex. *Legumes* 4 5·5 cm. long, 3 mm. broad, densely grey-silky along middle and dark brown along sutures.

Angola.—At sandy margins of forests between Bumba and Condo, *Welwitsch* 2071 (K., Pa., G., B.).

Transvaal.—Barberton district: Kaapsche Hoop, *Rogers* 20882 (B.M., P., W.); *Rogers* 20778 (T.M.); Lydenburg district: in grassland at Havelock, *Liebenberg* 2391 (P.). Pretoria district: in grass, Hamanskraal, *Schlechter* 4193 (K., B. M., G., V., Z., B., T.M., B.H., A.M.); Pienaars River, Bushveld, *Rehmann* 4797 (K., B.M., Z.); Elands River and Drift, Bushveld, *Rehmann* 4927 (Z); Kopjes, Daspoort, *Leendertz* 596 (A.M., T.M.); Rustenburg district: Rustenburg, *Nation* 359 (K., B.H.); *Rogers* 18725 (T.M.); Waterberg district: in collibus lapidosis graminosisque prope Potgietersrust, *Leendertz* (T.M., S.A.M., A.M.); Rooiplaat, *Leendertz* 759 (T.M., B.H.); Vygenboompoort, near Naboomspruit, *van Dam* (T.M.); sandveld, Mosdene, Naboomspruit, *Galpin* M. 86 (P.); Pietersburg district: Between Koedoes and Middel Letaba River, *Junod* 1554 (Z., G.).

3. **T. sphaerosperma** (D.C.) Baker in Oliv. Fl. Trop. Afr. 2. 125 (1871); Engl. Bot. Jahrb. 9.29. (1888); O. Kuntze Rev. Gen. Pl. 1 (1891); Burtt Davy and Pott in Ann. Tvl. Mus. 3. 3. 146 (1912); Ann. Bolus Herb. 1. 1. 15 (1914); Ann. S. A. Mus. 9. 4. 256 (1915); Engl. and Drude Die. Veg. der Erde 9. 590. Fig. 292 (1915); Bak. f. Leg. Trop. Afr. 1. 215 (1926).

Syn:—*Requienia sphaerosperma* DC. Ann. Soc. Nat. Ser. 1. IV 91. (1825); Leg. Mem. 6.226 t. 38 (1825); Harvey in Harv. and Sond. Fl. Cap. 2.231 (1861-62); Burtt Davy Fl. Tvaal. 1. 2. 379 (1932).

Co-type specimens, *Burke* and *Zeyher* 368, in Herbarium, Kew.

A copiously branched diffuse undershrub. *Stems* numerous, rigid, branching, procumbent or suberect, flexuous, more or less densely grey-pubescent, about 30 cm. long. *Leaves* unifoliolate, obovate or orbicular, subobcordate, often complicate, mucro recurved, both surfaces finely grey downy, veins prominent on lower surface, 0·5–12 cm. long, 0·4–1·6 cm. broad; petioles 2–4 mm. long. *Flowers* pale yellow, axillary, very shortly pedicellate, 1–3 together, 3·5–4 mm. long. *Calyx* pubescent, tube 3–3·5 mm. in diam., about 1·5 mm. long, lobes lanceolate, about 0·5–1 mm. long, lowest longest. *Vexillum* obovate, 2–3 mm. long, about 1·5 mm. broad. *Ovary* 2·5 mm. long, pubescent. *Style* about 1 mm. long, incurved, glabrous. *Legume* thinly pubescent, 1-seeded, tapering to the base, 5 8 mm. long, 2·5–3 mm. broad.

South West Africa.—Omahekeinsel bei Karibib, *Dinter* 6875 and *Dinter* 6975 (D. Coll.); Palmerswald, *Dinter* 2355 (B.); Giftkoppie, *Dinter* 1432 (Z., B.); Inachab, *Dinter* 1149 (Z.); and *Dinter* 1155 (Z., B.); Oshihoho, *Schinz* 545 (Z., B.H.); Okahandja, sandige Ufer 1300 m. *Dinter* 305 (K., B.M., Z., G., B., S.A.M., A.M.); am sandwege Grotfontein-Grosshuis, *Dinter* 7274 (K., D.Coll.); Namabezirk, Narib sandfelder zuusehen den Dunen der Kalahari-hugel, *Engler* 6553 (B.); Sandboden in Sandverhaar, *Schafer* 279 (B.); sand dunes at Sandverhaar, *Pearson* 4683 (K., B.M., B.H.); and *Pearson* 4915 (K.); Quickborn, Waterberg, *Bradfield* 191 (P.); Mariental, Einup, *Steyn* 22534 (P.); sand dunes between Noachabeb and Grundoorn, *Pearson* 7892 (K., B.M., N., A.M., B.H., P., Kim.); Damaraland, *Een* (B.M.); No definite locality, *Dinter* 5153 (D. Coll.); *Dinter* (D. Coll.); *Seiner* 96 (B.).

Cape. -In arenosis, Kuruman, *Marloth* 1048 (B., P., A.M.); near source of Kuruman River, *Burchell* 2514 (K.); Armoeds Vlakte, Vryburg, *Mogg* 8265 (P.); Griqualand West; between Asbestos Mountains and Wittewater, *Burchell* 1693 (K., B.).

Orange Free State.—Kroonstad district: common in grassveld, Bothaville, *Goossens* 1202 (P.).

Transvaal.—In collibus arenosis prope Crocodile and Aapies River, *Zeyher* 368 (K., B.M., Pa., S.A.M.); Vereeniging, *Gilfillan* (B.M.); near Pietersburg, *Schlechter* s.n. (B.) probably Pretoria district, *Rutherford* (K.).

Rhodesia.—Victoria Falls, *Schwarz* (B.H.).

South Africa.—No definite locality, *Burke* (K.); *Chapman* and *Baines* (K.); *Lemue* (G.).

4. **T. pseudosphaerosperma** Schinz in Viertelsjahrschr. Nat. Ges. Zurich 57, 557 (1912); Bak. f. Leg. Trop. Afr. 1.215 (1926); Die Veg. der Erde 9.3.591 (1915).

Type specimen, *Fleck* 334a, in Botanisches Museum, Zurich.

Stems erect or ascending, several arising from the rootstock. *Leaves* simple, 2–6·5 cm. long, 1–1·5 cm. broad, elliptic to elliptic-lanceolate or elliptic-spathulate, wedge-shaped at base, mucro recurved, densely appressedly sericeous on both sides, petioles about 2–3 mm. long. *Stipules* subulate, 1–2 mm. long. *Flowers* axillary, 2–4 together, small; pedicels 1–2 mm. long. *Calyx* densely sericeous, tube 2–3 mm. long, lobes unequal, 1–2 mm. broad. *Ovary* 4 mm. long, densely sericeous. *Style* glabrous, 1·5 mm. long. *Legume* one-seeded, 0·5–1 cm. long, 2–4 mm. broad, sericeous.

South West Africa.—Omalhelhe bei Epasa, *Seiner* 352 (Z., B.); Karribib, Omalhekersmsel, *Dinter* 6975 (P.).

Bechuanaland.—Uschi, Kalahari, *Fleck* 334a (Z.); Mochudi, *Rogers* 6591 (K., Z.); *Harbor* [Rogers 6336] (P.); *Harbor* [Rogers 6499] (B.H.).

5. **T. Forbesii** Baker in Oliv. Fl. Trop. Afr. 2.116 (1871) in nota; Die Veg. der Erde 9 3.589 (1915); Burtt Davy Fl. Tvaal. 1.2.379 (1932); (*T. salicifolia* Schinz, in part.).

Type specimen, *Forbes* s.n. in Herbarium, Kew.

Perennial. *Stems* ascending, slender, branching, with short grey or fulvous pubescence *Leaves* simple, subsessile, linear, mucronate, apex recurved, glabrous above, pilose below, 2·5–7 cm. long, 0·4–1·1 cm. broad. *Stipules* setaceous, 3–6 mm. long. *Flowers* 0·9–1·3 cm. long, pale mauve-pink, solitary or in pairs in the axils of the leaves; pedicels 0·4–1 cm. long. *Calyx* silky, tube 4–5 mm. in diam., 2 mm. long, lobes linear-subulate, all more or less the same length, 4–7 mm. long. *Vexillum* suborbicular, silky without, 0·8–1 cm. long, 5–9 mm. broad, claw short, 1–2 mm. long; carina 0·7–1 cm. long, 2–3 mm. broad; alae 0·9–1·1 cm. long, 2–3 mm. broad, with a short tail at the base of each lobe. *Ovary* 6–7 mm. long, silky. *Style* 2 mm. long, penicillate. *Legume* linear, thinly appressedly silky, 2·5–3·5 cm. long, 3–4 mm. broad.

Transvaal.- Waterberg district: in sandveld, Mosdene, Naboomspruit, *Galpin* 11667. (K., B.H., N., P.); and *Galpin* M 84 (P.).

Portuguese East Africa.—Ad sinum Delagoa Bay, *Forbes* 77 (P.); Delagoa Bay, *Forbes* s.n. (K.); *Junod* 168 (G., Z., B.); Rikatla, Lourenço Marques, *Junod* 546 (T.M.); Lourenço Marques, *Schlechter* 11519 (K., B.M., G., Pa., V., Z., B.); *Howard* 25 (B.H.); *Borle* 585 (P.); sandflats east of docks, Lourenço Marques, *van Nouhuys* (T.M.).

6. **T. virgata** H. M. Forbes sp. nov., affinis *T. Forbesii* Bak., sed foliis angustioribus, caulibu senicibus multo ligneis differt.

Suffruticosus. Caules novelli tenuiter appresse albo-pubescente, caules senices lignei, subnigri. *Folia* simplicia, lineari-lanceolata, 1·5 2·5 cm. longa, usque ad 2 mm. lata, mucronata, retusa, parva, supra glabrescentia, subtus appresse pubescentia; stipulae angusto-lineari-subulatae, usque ad 1 mm. longae. *Flores* axillares, geminati, 4 mm. longi; pedicelli graciles, usque ad 4 mm. longi; lobi calycis pilosi, tubo aequilongi; stylus pilosus. *Fructus* linearis, complanatus appresse pubescens, 1·5 cm. longus, 3 mm. latus.

Type specimen, *Pole Evans* s.n., in National Herbarium, Pretoria, and Natal Herbarium, Durban.

Small, somewhat shrubby plant. *Stems* when young, slender, appressedly albo-pubescent, when old, woody and almost black in colour. *Leaves* simple, sessile or subsessile, linear-lanceolate, mucro retuse, small, glabrous above, appressedly pubescent below, 1·5 2·5 cm. long, up to 2 mm. broad. *Stipules* narrow, linear-subulate, up to 1 mm. long. *Flowers* axillary, in pairs, 4 mm. long. *Pedicels* slender, 4 mm. long. *Calyx* softly pilose, lobes equalling the tube, ciliate. *Vexillum* 4 mm. long, 3 mm. broad ; carina eared at base. *Style* bearded. *Legume* linear, flattened, thinly appressedly pubescent, 1·5 cm. long, 3 mm. broad, 2–4 seeded.

Transvaal.—Greefswald 615, nr. Mapungubwe, *Pole-Evans* (P., N.).

One gathering only of this plant has been seen. The dark woody stems, apparently arising from a woody rootstock, bearing the young leaf- and flowering-stems, make this species quite distinct from any other. The greyish-green leaves and very small pink-mauve flowers tend to make the plant inconspicuous. From its appearance this plant probably grows in very arid regions.

7. **T. monophylla** Schinz in Viertelsjahrsch. Nat. Ges. Zurich, 52. 424 (1907).

Type specimen, *Fleck* 836, in Botanisches Museum, Zurich.

Stems erect, slender, densely appressedly argenteo-sericeous. *Leaves* shortly petiolate, unifoliolate, oblong-elliptic, mucronulate, glabrous above, sericeous below, 1·5–5·5 cm. long, 3–8 mm. broad ; petioles 4 6 mm. long. *Stipules* up to 2 mm. long. *Flowers* solitary, axillary, on pedicels up to 2 cm. long. *Calyx*-tube 3 mm. long, 5 mm. in diam., two upper lobes short, connate, lateral and lowest lobes approximately 2 mm. long. *Vexillum* 1–1·2 cm. long, 4–5 mm. broad. *Ovary* 5 mm. long, pilose. *Style* 1–1·5 mm. long, glabrous. *Legumes* up to 4 cm. long, 4 mm. broad, slightly falcate, appressedly argenteo-sericeous.

South West Africa.—Rehoboth, *Fleck* 836 (Z.) ; Hereroland, *Fleck* 436 (Z.) ; Sandibenen bei Inachab, *Dinter* 1158 (Z.) ; Usakos, *Dinter* 5927 and *Dinter* s.n. (D. Coll.) ; Karibib, *Dinter* 778 (D. Coll.) ; Grosser Kalkber, *Dinter* 7703 (B., D. Coll.).

8. **T. Pietersii** H. M. Forbes sp. nov., affinis *T. Forbesii* Bak., sed foliis pedicellisque longioribus differt.

Caulis gracilis, ascendens, simplex vel parce ramosus. *Folia* simplicia, lineari-lanceolata, 2·8–7 cm. longa, 3–7 mm. lata ; mucronata, mucrone retuso, supra glabrescentia, subtus appresse pilosa ; petioli graciles, 0·3–1·2 cm. longi ; stipulae angusto-subulatae, 2–5 mm. longae, pubescentes. *Flores* axillares, solitarii vel terni, purpurei, 0·9–1·2 cm. longi ; pedicelli 4–5·5 mm. longi ; lobi calycis lineari-subulati, pilosi, ciliati, tubo aequilongi vel breviores ; stylus glaber. *Fructus* 2–3 cm. longus, 3 mm. latus, leviter falcatus, pubescens.

Natal.—Ladysmith district : near Pieters, 3–4000 ft., 1900, *Wood* in Natal Herb. 8888, Type.

Stems slender, ascending, simple or laxly branched, 1–4 arising from the rootstock, up to 10 cm. long. *Leaves* unifoliolate, linear-lanceolate, slightly falcate, mucro short, recurved, glabrescent above, thinly appressedly pilose beneath, 2·8 7 cm. long ; petioles slender, 0·3 1·2 cm. long, with two small bracts 1 1·5 mm. long at apex. *Stipules* narrow subulate, pubescent, 2–5 mm. long. *Flowers* axillary, solitary or three together, purple, 0·9–1·2 cm. long ; pedicels 4–5·5 mm. long. *Calyx* pilose, tube 5 mm. in diam., lobes unequal, lateral and lowest longest. *Vexillum* silky without, 0·9 1·2 cm. long, 4 7 mm. broad ; alae 1 1·2 cm. long, 2·5 mm. broad, sparsely pilose without and ciliate, especially

towards base of lobe ; carina 6·5 7·5 mm. long, 2 mm. broad. *Staminal-tube* 5·5 mm. long, vexillary stamen attached. *Ovary* silky, 5 mm. long. *Style* 2 mm. long, glabrous. *Legume* slightly falcate, pubescent, 2–3 cm. long, 3 mm. broad.

9. **T. gracilenta** H. M. Forbes sp. nov., affinis *T. Pietersii* H. M. Forbes, sed caulibus gracilioribus, foliis brevioribus angustioribusque, floribus flavidis differt.

Caules graciles, ascendentes. *Folia* simplicia, lineari-lanceolata, 2·3–3·9 cm. longa, 2·5–5 mm. lata, subtus appresse pilosa, supra glabresentia, apice retusa, mucrone parvo ; petioli 2·5 6 mm. longi ; stipulae setosae, 2 3·5 mm. longae. *Flores* axillares, solitarii, flavi ; pedicelli 5·5 mm. longi ; dentes calycis tubo breviores ; stylus glaber. *Fructus* non visus.

Natal. Entabeni district : Gingindhlovu, 1933, *Gerstner* in Natal Herb. 23083, Type.

Stems slender, ascending, thinly appressedly pilose becoming glabrous when older. *Leaves* unifoliolate, linear-lanceolate, appressedly pilose below, glabrous above, mucro small, recurved, 2·3-3·9 cm. long, 2·5–5 mm. broad ; petioles 2·5–6 mm. long, with two small bracts at apex. *Stipules* setaceous, 2 3·5 mm. long. *Flowers* yellow, solitary in axils of leaves, 1 1·5 cm. long ; pedicels 5·5 mm. long. *Calyx*-tube 5 mm. in diam., 2·5 mm. long, lobes ciliate, shorter than the tube. *Vexillum* silky without and long ciliate round margin at base of lobe. *Ovary* densely silky, 5 mm. long. *Style* glabrous, about 1 mm. long. *Legume* not seen.

KEY TO SECTION 2.

Leaves palmate, 4–7-lobed	10. *lupinifolia.*
Leaves digitate, 3-lobed	A.
A. Pods flat ; leaves generally 2–3-jugate	65. *macorpoda.*
Pods not flat ; leaves always 3-lobed	B.
B. Pods twisted into loose spiral	12. *contorta.*
Pods plicately folded	11. *plicata.*

10. **T. lupinifolia** (Burch.) DC. Prodr. 2.255 (1825) ; Linnaea 23. 31 (1850) ; Harvey in Harv. and Sond. Fl. Cap. 2.204 (1861 62) ; Baker in Oliv. Fl. Trop. Afr. 2.107 (1871) ; O. Kuntze Rev. Gen. Pl. 1.175 (1891) ; Durand and Schinz Etudes sur la Fl. du Congo. 105 (1896) ; Durand Syll. Fl. Congo. 132 (1909) ; Burtt Davy and Pott in Ann. Tvl. Mus. 3,3.146 (1912) ; Fries in von Rosen. Schwed. Rhod.-Congo Exped. 1911-12, 1.81 (1914) ; Die Veg. der Erde, 9, 3.586 (1915) ; Trans. Roy. Soc. S.A. 5, 4.375 (1916) ; De Wild in Bull. Soc. Bot. Belg. 577,2.122 (1925) ; Bak. f. Leg. Trop. Afr. 1.183 (1926) ; Bot. Survey Springbok Flats, Mem. 12,68 (1928) ; Hutch. and Dalziel Fl. West Trop. Afr. 1, 2.385 (1928) ; Young in Ann. Tvl. Mus. 14,4.398 (1932) ; Burtt Davy Fl. Tvaal. 1.9,378 (1932) ; Watt and Breyer-Brandwijk Med. and Pois. Pl. S.A. 74 (1932).

Syn. *Galega lupinifolia* Burch. in DC. Prodr. 2.255 (1825) ; *Rhynchosia* (*Polytropia*) *Cienkowski* Schweinf. Reliq. Kotschy. p. 31, t. 24 5 (1868) ; *Cracca lupinifolia* O. Ktz. Rev. Gen. Pl. 1.175 (1891) ; Hiern in Cat., Afr. Pl. Welw. 1.219 (1896).

Type specimen, *Burchell* 2488, in Herbarium, Kew.

Suffruticose. *Stems* diffuse, with stems , petioles, peduncles and young leaves roughly fulvo-hirsute. *Leaves* 4–5 foliolate, palmate ; leaflets 1·5 8·5 cm. long, 0·4–1·8 cm. broad, oblanceolate, mucronate, apex recurved, margin thickened, glabrous or sparsely hirsute above, fulvo-hirsute beneath ; petioles 1 8·5 cm. long. *Stipules* short, broadly subulate, ribbed, 2 5 mm. long. *Peduncles* terminal and axillary, 9 26 cm. long, laxly flowered. *Flowers* small, 5–7 mm. long, in fascicles of 2–3 ; pedicels 3–7 mm. long. *Calyx*

2·5–5 mm. long, pilose, lobes subequal, lanceolate, acuminate, 1·5–3 mm. long. *Vexillum* sericeous without, subrotund, about twice as long as the calyx. *Ovary* appressedly villous. *Style* short, glabrous. *Legume* linear, flat, pubescent, 2·5–3·5 cm. long, 3–5 mm. broad.

South West Africa.—Between Kunene River and Eunda, *Barnard* 780 (S.A.M.); Bushveld, Grasslippe uber Lehm, *Dinter* 2327 (B.); Okandjose, *Dinter* 528 (Z.); Amboland, Onamakunde, *Rautanen* 20 (B.); Omnlonga, *Schinz* 2086 (Z.); Oshiheke, *Schinz* 2087 (Z.); Otyvaronga district, Quickborn, Okohandja, *Bradfield* 359 (P., T.M.); Damaraland: Olukonda, *Rautanen* 512 (Z.); Ondonga, Olukonda, *Rautanen* 514 (Z., G.); *Rautanen* 517 (Z.); No definite locality, *Rautanen* 513 (K., Z., V., G.).

Cape.—Little Klobbokhonni near Harnapery, *Burchell* 2488 (K., G.); Mochudi, *Harbor* 6498 in Herb. Rogers (B.H.). Kuruman district: in arenosis, Marmosis, Kuruman, *Marloth* 1047 (P.); Vryburg district: Grasfort, Vryburg, *Mogg* 8333 (P.); Biesjesvlakte, Vryburg, *Henrici* 67 (P.); Vryburg, *Burtt Davy* 11111 (P.); East Griqualand in arenosis pr. Botsabelo, *Schlechter* 4101 (Z., B., G.H.).

Orange Free State.—Bothaville, Kroonstad, *Goossens* 1165 (P.).

Transvaal.—Potchefstroom district: Vaal and Mooi Rivers, *Burke* and *Zeyher* 343 (K., B.M., S.A.M.); Vereeniging district: Vereeniging, *Gilfillan* (P.); Witwatersrand district: grass veld, Canada, near Johannesburg, *Moss* 13603 (W.); Lichtenburg district: Lichtenburg, *Jenkins* (T.M.); townlands, Klipveld, Lichtenburg, *Liebenberg* 69 (P.); Barberton district: Research Station, Nelspruit, *Liebenberg* 2447 (P.); *Carolina* district: Waterval Bôven, *Rogers* [T.M. 14875] (T.M.); *Rogers* 18408 (Z.); Middelburg district: Witbank, *Rand* 142 (B.M.); Pretoria district: T.U.C. Farm, Pretoria, *Moss* 8489 (B.M., W.); road to Daspoort, *Leendertz* 579 (B.H., T.M.); Wonderboom, *Smith* 2268 (P.); between station and level crossing, Wonderboom, *Smith* 6243 (P.); Wonderboompoort, *Rehmann* 4607; (Z.); Magaliesberg near Wonderboom, *Burtt Davy* 2659 (P., B.H.); between Bronkhorstspruit and Middelburg, *Wilms* 361 (B.M., G., B.); Middelkop near Pienaars River, *Smith* 2155 (P.); near Koedoespoort, *Smith* 1534 (P.); Bushveld near Eland River and Klippan, *Rehmann* 5032 (K., B.M., Z.); Aapies and Vaal Rivers, *Burchell* 2270 (K.P.); *Burke* 343 (Z.); Vaal River, *Burke* (Pa.); Waterberg district: Strydpoort, Makapaansberge, *Rehmann* 5550 (Z., B.); Mosdene, Naboomspruit, *Galpin* M. 81 (P., Z.M.); Rustenburg district: Rustenburg, *McClelland* (G.U.C.); Marico district: Zeerust, *Burtt Davy* 7191 (P.); district unknown: in arenosis pr. Mordiniobole, *Schlechter* 4262 (K., B.M., G., V., Z., B., T.M., A.M.); Zandrivierspoort, *Rogers* 24961 (Z., T.M.); Kalahari Region, *Maclea* 6074 (B.H.).

Southern Rhodesia.—Bulawayo district: Matopos, *Rogers* 5682 (T.M., S.A.M., B.H.); *Eyles* 1154 (Pa., Z., S.A.M.); Victoria Falls, *Rogers* 5605 (Z.); *Fries* 20 (Z.); *Flanagan* 3127 (B.H.); south bank of Zambesi, Victoria Falls, *Rogers* 5716 (K., B.H.).

Northern Rhodesia.—Barotseland, *Watt* and *Brandwyk* 286 (P.).

Angola.—*Welwitsch* 2076 (P., G.); *Welwitsch* 2077 (G., B.); *Gossweiler* 365 (B.).

South Africa.—No definite localities, *Zeyher* 457 (B.M.); Cape (?) 1850, *Zeyher* 458a (K., B.M., Pa., G., Z., B., S.A.M.); *Drège* 458 (V.); *Burchell* 2527 (K.); 1846 Lemue (G.).

This plant is known as "namiyati" to certain native tribes, and a preparation of the root is used by them for procuring abortion and for committing suicide.

11. **T. plicata** Oliv. in Hook. Ic. Pl. t. 1445 (1883); Wood Fl. of Natal 342 (1907); Wood in Trans. S.A. Phil. Soc. 18.2. 147 (1908); Burtt Davy and Pott in Ann. Tvl. Mus. 3.146 (1912); Bews Fl. Natal and Zululand 111 (1921); Bot. Survey S.A. Mem. 12.68 (1928); Burtt Davy Fl. Tvaal. 1.7.378 (1932).

Syn. *Ptycholobium plicatum* (Oliv.) Harms in Engl. Pflanzenw. Afr. 3.1. (1915); Engl. and Drude, Veg. der Erde 9.591 (1915) in obs.

Type specimen, *Rehmann* 4922, in Herbarium, Kew.

Suffruticose, 15–30 cm. high. *Stems* rigid, diffusely hirto tomentellous, procumbent or ascending. *Leaves* trifoliolate, shortly petiolate; leaflets rigid, narrow oblanceolate, apex mucronate, recurved, glabrous above, pubescent below, 0·9–4 cm. long, 0·2–1 cm. broad; petioles 2–7 mm. long. *Stipules* subulate, 1–3 mm. long. *Flowers* minute, 6 mm. long, axillary, subsessile, often geminate. *Calyx* tube 2 mm. long, 3–5 mm. in diam., lobes about 2 mm. long, lanceolate, acute. *Vexillum* obovate, subpanduriform, retuse, unguiculate, appressedly pubescent without, 6 mm. long, 3 mm. broad; alae ciliate round lower part of lobe. *Ovary* pilose, 3–4 mm. long. *Style* about 1 mm. long, glabrous. *Legume* 0·9–1·3 cm. long, 5 mm. broad, abruptly transversely 3–5 plicate.

Zululand.—No definite locality, *Gerrard* 1087 (K.)

Transvaal.—Barberton district: Berea, Barberton, *Thorncroft* 111 (K., P.); *Thorncroft* 884 (N., V.); *Rogers* 18544 (P.); *Pott* 5349 (T.M.); Kaapmuiden, *Rogers*, 25075 (G., Z., T.M.); Pretoria district: Elands River and Drift, Bushveld, *Rehmann* 4922 (K., Z.); *Rehmann* 5181 (Z., B.); in graminosis pr. Pienaars River Bridge, *Schlechter* 4212 (K., Z., V., G., B., B.H., A.M., T.M.); Onderstepoort, *Theiler* (T.M.); near Cheop Pyramid, *Mogg* 1241 (P.); Rooikop, Bushveld, *Smuts* and *Gillett* 2125 (P.); Rust der Winter, *Pole-Evans* 3879 (P.); Waterberg district: Sandveld, Mosdene, Naboomspruit, *Galpin* M.90 (P.); Sandrivierspoort, *Rogers* 24976 (B.M., P.); Pietersburg district: Sand River, *Murray* 610 (P.); Zoutpansberg district: Mara, *Rogers* 22271 (P., T.M.).

Portuguese East Africa.—Ressano Garcia, *Schlechter* 11830 (K., G., A., B.).

12. **T. contorta** N.E. Br. in Kew Bull. 103 (1909); Engl. in Engl. and Drude Veg. der Erde 9.3.1. 568 (1915).

Syn. *Sylitra contorta* (N.E. Br.) Bak. f. Leg. Trop. Afr. 1. 268 (1926); Bothalia 3.2.239 (1937).

Type specimen, *Lugard* 132, in Herbarium, Kew.

A shrub with straight twig-like branches, whole plant densely albo-tomentose. *Leaves* trifoliolate, petiolate; leaflets 1·5–4 cm. long, 0·6–1·2 cm. broad, cuneate-oblong, obtuse, mucro recurved, glabrous above, pubescent beneath with adpressed silky white hairs, medial leaflet longest. *Stipules* 2–4 mm. long. *Flowers* axillary, small, fasciculate, 3–4 together, 7–8 mm. long. *Calyx* villous, tube 4 mm. in diam., 2 mm. long, teeth subulate, three equal in length to the tube, two upper shorter and slightly connate. *Vexillum* 6–7 mm. long, 2–3 mm. broad, pubescent on the back. *Ovary* densely villous-tomentose, 2·5–4 mm. long. *Style* slender, glabrous. *Mature legumes* twisted into a loose spiral, densely villous-tomentose with white hairs.

Bechuanaland.—Ngamiland, Kwebe, *Lugard* 132 (K.).

Transvaal.—Zoutpansberg district: Messina, *Rogers* 20042 (K., G., P., Z.); *Rogers* 20812 (N., P., W.); *Pole-Evans* 1718 (P.); between Saltpan and Waterpoort, Zoutpansberg, *Obermeyer, Schweickerdt* and *Verdoorn* 267 (P.); near Catophractes belt, Zoutpan, *Schweickerdt* and *Verdoorn* 508 (P.); Zoekmakaar, Pietersburg, *Rogers* 22598 (Z., P.); Lydenburg district: Ohrigstad Branddraai Road, *Young* A583 (T. M.); Sandrivier, *Schlechter* 4592 (B., B.H.).

This plant is very closely allied to *T. plicata* Oliv., but the legumes are spirally twisted instead of plicately folded.

Baker f. Leg. Trop. Afr. p. 168 suggests that Fig. 290 in Engl. Veg. der Erde is *T. contorta* N.E. Br., but in my opinion this figure is typical *Sylitra contorta* E. Mey. Engler's sug-

gestion that *T. contorta* N.E. Br. perhaps belongs to the genus *Sylitra* is also incorrect. One of the main differences between the two genera (*Tephrosia* and *Sylitra*) is the pod, which in the latter genus is of a thin papery texture. In *T. contorta* the pods are of a much firmer texture and are also much more contorted than those of *Sylitra*.

KEY TO SECTION 3.

Stems erect	A.	
Stems procumbent, spreading or ascending	B.	
A. Stipules subulate	C.	
Stipules linear, setaceous or lanceolate	D.	
C. Whole plant densely silvery canescent		13. *canescens.*
Whole plant not densely silvery canescent	E.	
E. Flowers in axils of upper leaves, or few on short terminal peduncles up to 2·5 cm. long		14. *stricta.*
Flowers on terminal, axillary or leaf-opposed peduncles	F.	
F. Pubescence on stems, etc., yellow or brown	G.	
Pubescence on stems, etc., greyish	H.	
G. Stems, etc., with close or spreading yellowish pubescence		15. *polystachya.*
Stems, etc., with short ascending brown hairs		16. *noctiflora.*
H. Peduncles terminal and leaf-opposed	I.	
Peduncles terminal and axillary	J.	
I. Leaves 2–4–jugate, leaflets linear-lanceolate; pods pale yellow-green		17. *Dregeana.*
Leaves 3–8–jugate; pods not pale yellow-green	K.	
K. Leaflets cuneate-oblong, dark green above, pale green below; pods linear, velvetty		18. *pallens.*
Leaflets oblanceolate; pods slightly falcate, thinly pubescent		19. *delagoensis.*
J. Leaves 1–6–jugate; leaflets more or less densely canescent below		22. *discolor.*
Leaves not–canescent below	L.	
L. Leaves 7–9 jugate; peduncles laxly racemose		20. *amoena.*
Leaves 4–8–jugate; peduncles few flowered at apex		21. *Medleyi.*
D. Style glabrous	M.	
Style bearded or penicilliate at apex	N.	
M. Stems, etc., densely cano-pubescent	O.	
Stems, etc., yellow, brown or grey pubescent	P.	
O. Leaves 2–6–jugate; leaflets up to 3 cm. long, cano-pubescent on both sides		23. *euchroa.*
Leaves 5–9-jugate; leaflets up to 1·8 cm. long, glabrous and pale green above, densely canescent below		24. *pallida.*
P. Pubescence grey	Q.	
Pubescence yellow or brown	R.	
Q. Leaves 6–12-jugate; leaflets complicate; peduncles laxly many flowered		25. *Kraussiana.*
Leaves 3–5–jugate; leaflets not complicate; peduncles sparsely flowered		26. *sparsiflora.*
R. Leaves 5–17-jugate; stipules 4–6 mm. long		27. *polystachyoides.*
Leaves 5–9-jugate; stipules up to 1 cm. long		28. *Ehrenbergiana.*
N. Style penicilliate at apex	S.	
Style bearded	T.	
S. Veining on lower surface of leaflets dark brown		29. *oxygona.*
Veining on lower surface of leaflets not dark	U.	
U. Peduncles densely many flowered		30. *zoutpansbergensis.*
Peduncles laxly flowered	V.	
V. Leaves 1–2-jugate, sometimes simple		31. *griseola.*
Leaves 3–17-jugate, never simple	W.	
W. Leaves 7–17-jugate; leaflets up to 2 cm. broad		32. *purpurea.*
Leaves 3–9-jugate; leaflets rarely 1 cm. broad	X.	
X. Leaves 6–9-jugate; leaflets up to 9 mm. broad, oblanceolate		33. *Evansii.*
Leaves 3–8-jugate; leaflets up to 6 mm. broad, narrow oblanceolate		34. *transvaalensis.*

T. Peduncles up to 7 cm. long, flowers few in a short dense raceme... 35. *inandensis.*
Peduncles 8–31 cm. long, laxly many flowered.....Y.

Y. Leaves 3–8-jugate ; peduncles 10–15 cm. long..... 36. *otaviensis.*
Leaves 7–14-jugate ; peduncles 8–31 cm. long..... 37. *lactea.*

B. Stipules setaceous, linear or linear-lanceolate.....(*a*)
Stipules subulate.....(*b*).

(*a*) Stems ascending.....(*c*).
Stems procumbent or trailing.....(*d*).

(*c*) Leaves sessile or subsessile..... 38. *tzaneenensis.*
Leaves distinctly petioled.....(*e*).

(*e*) Style glabrous ; leaves 1–2 jugate..... 39. *elongata.*
Style bearded ; leaves 1–8 jugate.....(*f*).

(*f*) Leaflets narrow linear-lanceolate, 2–4-mm. broad..... 40. *angustissima.*
Leaflets linear-lanceolate, up to 9-mm. broad.....(*g*).

(*g*) Leaves 1–4-jugate ; midrib lutescent, prominent on lower surface of leaflets..... 41. *lurida.*
Leaves 2–8-jugate ; leaflets argenteous below (lfts uncinate in var. uncinata)..... 42. *longipes.*

(*d*) Style penicillate ; veining dark reddish-brown on lower surface of leaflets..... 43. *multijuga.*
Style glabrous ; veining not dark.....(*k*).

(*h*) Whole plant more or less densely rufo-tomentose ; leaflets glabrous above..... 44. *semiglabra.*
Plant hirsute with long whitish hairs ; leaflets glaucous above.... 45. *Burchellii.*

(*b*) Stipules up to 6 mm. long.....(*i*).
Stipules 1–2 cm. long.....(*j*).

(*i*) Leaves 3–7-jugate, subsessile ; apex of leaflets very retuse..... 46. *retusa.*
Leaves 2–4-jugate, long-petioled ; apex of leaflets obtuse or acute 47. *capensis.*

(*j*) Flowers almost capitate in a short dense raceme at apex of peduncle ; calyx lobes short, triangular-subulate..... 48. *pseudocapitata.*
Flowers in an interrupted raceme or few at apex ; calyx teeth lanceolate.....(*k*).

(*k*) Apicies of leaflets truncate or emarginate ; calyx lobes longer than tube..... 49. *natalensis.*
Apicies of leaflets apiculate ; calyx lobes equal to tube..... 50. *apiculata.*

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13. **T. canescens** E. Mey. Comm. Pl. Afr. Aust. 1.1.109 (1836) ; Hook. Lond. Journ. Bot. 2.88 (1834) ; Cape Plants, Krauss and Engler 54 (1846) ; Harvey in Harv. and Sond. Fl. Cap. 2.204 (1861 62) ; O. Kuntze Rev. Gen. Pl. 1.174 (1891) ; Wood. Fl. of Natal 41 (1907) ; Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908) ; Bews Fl. Natal and Zululand 110 (1921) ; Bak. f. Leg. Trop. Afr. 1.188 (1926) ; Henkel, Ballenden and Bayer Ann. Nat. Mus. 8.1.106 (1936).

Type specimen, *Drège* s.n. in Botanisches Museum, Berlin-Dahlem.

Suffruticose, erect, whole plant densely silky and silvery canescent, 60 95 cm. high *Stems* slender, flexuous, terete, branching a little. *Leaves* 4–8 jugate, 3·5 10·5 cm. long petiolate ; leaflets petiolulate, 0·9–3 cm. long, 0·35–1·3 cm. broad, obovate-oblong, obtuse or emarginate, densely canescent on both sides. *Stipules* 1–2 mm. long, subulate. *Peduncles* 2–15 cm. long, racemes many-flowered, leaf-opposed. *Flowers* 0·9 1 cm. long, pink-mauve ; pedicels 3 6 mm. long. *Calyx* canescent, tube 6–7 mm. in diam., 2 mm. long. *Ovary* 5 6 mm. long, silky canescent. *Style* glabrous, 2·5–3 mm. long. *Legume* 4–5 cm. long, 5–6 mm. broad, 4–6 seeded, canescent.

Natal.—Durban, *Cooper* 2200 (K.) ; *Wilms* 1952 (K., B.M.) ; *Wood* 11836 (Z., P., N., W.) ; *Moss* 5307 (B.M., W.) ; open dune scrub, *Moss* 5306 (W.) ; *Wood* 8753 (N.) ; *Rehmann* 8692 (Z.) ; in frutice ad oram pr. Durban, *Wood* 6270 (B.M., B., Pa., B.H., P., T.M.) ; *Wood* 8046 (B.) ; Snell Parade, Beach, Durban, *van Nouhuys* (N., T.M.) ; sandy places near Omsamculo, *Drège* (B.) ; no definite locality, *Drège* (K., B.M., V.) ; *Gerrard*

and *McKen* 5 (N.); sand dunes, Beach Terminus, 1913, *Thode* (S.); and 1914 *Thode* (B., S.); Zululand Umlalaas, *Gerstner* (N.); no definite locality, *Gerrard* and *McKen* 222 (K., B.M., Pa., V.).

Portuguese East Africa.—Delagoa Bay, *Forbes* (K., Pa.); in dunes, *Schlechter* 11987 (K., B.M., B., Pa., A., V., G.); *Wilmer* 306 (B.); Lourenço Marques, *Rogers* 11819 (K., B.M., Z., W., A.M.); *Rogers* 2247 (P., W., T.M.); *Junod* 215 (T.M.); *Borle* 423 (P.); near sea, Catemba, Lourenço Marques, *Borle* 450 (P.); *Muir* 478 (N.); Beira, *Dummer* 669 (K.); *Rogers* 4567 (B.M., Z., B.H., T.M.).

This small shrub occurs on the sand dunes along the Natal coast, extending to Zululand and up the East Coast to Beira. It is an attractive plant, especially when in bloom, for the bright pinky-mauve flowers contrast well with the silvery-white leaves and stems.

14. **T. stricta** (L.f.) Pers. Syn. 2.329 (1807); DC. Prod. 2.253 (1825); Spreng. Syst. Veg. 3.233 (1826); Ecklon and Zeyher Enum. Pl. Afr. Aust. Extratrop. 246 (1825); Harvey in Harv. and Sond. Fl. Cap. 2.205 (1861–62).

Syn. *Galega stricta* Ait. Hort. Kew. 3.70 (1789); Linn. Syst. Nat. ed. 13 per Gmelin 2.2.1130 (1792); Thunb. Prodr. 133 (1800) (sphalm. striata); Willd. Sp. Pl. 3.2.1244 (1803) (sphalm Galega). *Galega pulchella* Scopol. Delic. Insub. 1.3. t. 2 (1786); Vahl. Symb. 2.85 (1791). *Galega mucronata* Thunb. Prodr. 134 (1800). *Indigofera stricta* L.f. Suppl. 334 (1781); Linn. Syst. ed. Murray 678 (1784); Linn. Syst. Nat. ed. 13 per Gmelin 2.2.1129 (1792); Jacq. Hort. Schroenbr. 2.58 t. 236 (1797); Thunb. Prodr. 133 (1800); Willd. Sp. Pl. 3.2.1232 (1803); Spreng. Syst. Veg. 3.276 (1826).

Type specimen, *Ecklon* and *Zeyher* 1630, is deposited in the Thunberg Herbarium, Uppsala.

Suffruticose. *Stems* erect, branching, terete, clothed with cinereous tomentum. *Leaves* subsessile, 2–6-jugate. *Leaflets* 0·7–1·3 cm. long, 3–5 mm. broad, oblong or cuneate, mucronate, mucro recurved, glabrous above, pubescent below. *Stipules* 4–6 mm. long, subulate. *Flowers* few, almost sessile in axils of upper leaves, or occasionally a few borne on a short peduncle about 2·5 cm long. *Pods* 2·7–4 cm. long, 4 mm. broad, velvety when young, at length glabrescent.

Cape.—Swellendam district: on plains of George and Swellendam, *Bowie* 5 (B.M.); Riversdale district: *Burchell* 6728 (K.); George district: on the plains of Outeniqua, *Bowie* 3 (B.M.); Uitenhage district: inter frutices (alt. 111) collium prope Van Stadens rivier and in Olifantshoek, *Ecklon* and *Zeyher* 1630 (K., Pa., G., V., B., U., S.A.M.). No definite locality: *Dervaux* (G.); Cape 1772, *Oldenburg* 1103 (B.M.); *Masson* (B.M.).

15. **T. polystachya** E. Mey. in Comm. Pl. Afr. Aust. 10 (1836); Harvey in Harv. and Sond. Fl. Cap. 2.206 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Xalbh. Ann. K.K. Natuurhist. Hofmus. 20.3.24 (1905); Wood Fl. of Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Burtt Davy and Pott in Ann. Tvl. Mus. 3, 3.146 (1912); Phillips in Ann. S.A. Mus. 16.1.82 (1917); Bews Fl. Natal and Zululand 111 (1921).

Type specimen, *Drège* s.n. (5462 in Herb. E. Meyer), in Museum, Berlin-Dahlem.

Suffruticose, erect. *Stems* slender, straight, angular, rib-striate, clothed with close or spreading yellowish pubescence. *Leaves* shortly petioled, 3–9-jugate, 3–8·5 cm. long; leaflets cuneate-oblong, mucronate, flat or complicate, thinly pubescent above, more densely below, 0·7–3 cm. long, 3·5–9 mm. broad. *Stipules* subulate, 0·5–1 cm. long. *Peduncles* terminal and axillary, laxly racemose and many-flowered, up to 27 cm. long. *Flowers* 1–1·2 cm. long; pedicels 4–6 mm. long. *Calyx*-tube 3 mm. long, lobes ovate-acuminate, slightly shorter or equalling or exceeding the tube in length. *Vexillum* 1–1·1 cm.

long and broad, densely hairy without. *Ovary* densely long hairy. *Style* glabrous. *Legumes* narrow, linear or slightly curved, pubescent, 3·5–4 cm. long, 3 mm. broad.

Cape.—Stockenstroom district: edge of forest, Bergmans Kloof, Stockenstroom, *Scully* 205 (P.); Queenstown district: Mountains, Queenstown, *Galpin* 1757 (B.); grassy slopes, Lesseyton Nek, *Galpin* 1952 (K., A.M., P., B.H.); Bongola Dam, Abrahams, *Moss* 13237 (W.); Umtata district: in collibus pr. Umtata, *Schlechter* 6335 (B., A.M., B.H.); near Umtata, *Flanagan* 2853 (S.A.M.); *Bolus* 8878 (B.H.,S.); Baziza, Tembuland, *Baur* 77 (K., B., A.M., S.A.M., B.H.); inter Gekau and Bashee, *Drège* s.n. (K., B.); Omsamcaba, Pondoland, *Drège* s.n. (K., B.M., B.); Kreilis Country, Kaffraria, *Bowker* (K.); no definite locality, *Drège* in Herb. E. Meyer 5460, 5461, 5462 (B.); *Drège* 409 (V.); *Drège* s.n. (O., Pa., Z., V., G.); *Hennegart* 45 (Pa.); ex Herb. *Mrs. F. W. Barber* (A.M.).

Natal.—Port Natal, *Drège* (S.A.M.); edge of wood, Sydenham near Durban, *Wood* (G.); Pinetown district: Botha's Hill, *Wood* 6734 (P.); Pietermaritzburg district: near Howick, *Wood* 11432 (P.); Karkloof, *Dimock-Brown* 319 (P.); Krantzkop district: near Greytown, *Wylie* [Herb. No. 2046] (N., T.M.); *Wylie* [Herb. No. 22343] (N., T.M.); edges of bush, Tugela Valley, Krantzkop, *Thode* (B.); Klip River district: Van Reenen, *Wood* 1073 (N., T.M.); Districts unknown: Riet Spruit, *Wood* 10226 (N., T.M.); hills above Lynedock, *Wood* 4542 (K., B.); grassy slopes, Koenigsberg, *Thode* (B., S.); Zululand: Umgoya, *Wylie* [Wood 5665] (Pa.).

Var. **longidens** H. M. Forbes var. nov.

Lobis calycis multo longioribus et anguste lanceolatis valde distincta.

Type specimen, *Flanagan* 631, in National Herbarium, Pretoria.

Cape. –Komgha district: grassy valleys near Komgha, *Flanagan* 631 (Z., N., A.M.); Albany district: in humidis umbrosis prope Grahamstown, *MacOwan* 2026 (B.M., A.M., K.); Grahamstown, *Rogers* 1578 (B.H.); Kentani district: in valleys, *Pegler* 404, 100 ft., 1904 (B.H.); 1200 ft., 1905, 1910, 1914 (N.); Umtata district: forests, Bazeia, *Baur* 38 (B.).

Natal.—Ixopo district: Ixopo, *Schlechter* 6643 (A.M.).

This variety of *T. polystachya* is very similar in appearance to the variety *hirta*, but it is easily distinguished by the long narrow lanceolate calyx lobes. It is an erect shrubby plant, 2–4 feet high, with numerous pink or pale mauve flowers. The flowering period is from January to March.

Var. **hirta** Harv. in Harv. and Sond. Fl. Cap. 2.206 (1861–62).

Type specimen, *Sutherland* s.n., in Herbarium, Kew.

Stems, branches and inflorescence roughly rusty-pubescent, racemes shorter and more densely flowered than usual, and legumes more hairy.

Cape.—Transkei, Indutywa district: near Colosa, *Krook* [*Penther* 2606] (V.); East Griqualand, Umzimkulu district: ad rivos Clydesdale prope flumen Umzimkulu, *Tyson* 1435 (Z., B., G., O., S.); in pratis apud rivulos circa Clydesdale, *Tyson* 2048 (K., G., S.A.M., B.H.); Pondoland, *Bachmann* 604, 617, 621 (B.).

Natal.—Port Natal, *Gueinzius* 307 (Pa., V.); coast land, 0–1,000 ft., *Sutherland* (K.); Prospect, Durban North, *Forbes* 630 (N.); near Durban, *Wood* (G., A.M.); *Wood* 6269 (B.M., P.); edge of wood, Sydenham, near Durban, *Wood* (G.); Pinetown district: Hillary, *Wood* 13070 (N.); Pinetown, *Junod* 97 (Z.); Trappisten Kolonie, Mariannhill, *Landauer* 95 and 213 (B.); Umgeni district: Field's Hill, *Wood* 242 (B.M., N., B.H., S.A.M.); Krantzkloof, *Kuntze* (K.); Botha's Hill, *Wood* 6734 (Pa., B., P.); Greytown district: *Wylie* [H. No. 20461] (N.); *Wylie* [H. No. 22343] (N.); Krantzkop district: edge of bush, Krantzkop, Tugela Valley, *Thode* (B., S.); Estcourt district: Cathkin Park, Drakensberg, *Galpin* 11742 (K., P.); Tugela Valley, Mont-Aux-Sources, *Bayer* and *McClean* 226 (K.,

B.H., P., A.M.); Inanda district: Inanda, *Wood* 793 (K., B.M., N., B.H., Z., S.A.M.); Kearsney, *Milner* (N.); Tugela district: Nonoti, *Wood* 9188 (B.); Zululand, *Gerrard* 1106 (K., B.M., Pa., V.); Mtunzini, *Mogg* 4275 and 4371 (P.); Farm Egoa, *Curson* (P., S.); Farm 273, *Curson* 191 (P.); Bank of Pongola River, W. of Lebombo Mtns., Mkuzi, *Galpin* 13647 (Pa.); North Zululand, *Baker* [*Evans* 562] (N.).

Orange Free State.—No definite locality, *Cooper* 1042 (K., B.M, V, Z., B.H.).

Transvaal.—Pretoria district: Wonderboompoort, *Leendertz* 458 (T.M.); *Leendertz* 703 (B.H., T.M.); *Smith* 6062 (K., Pa., V., P.); Barberton district: Kaapmuiden, *Rogers* 23786 (W.); *Rogers* 25032 (Z., S.); Komatipoort, *Rogers* 21027 (K.); *Rogers* 12877 (W., A.M.); Lydenburg district: between Pilgrims Rest and Sabie, *Rogers* 24754 (Z.); Waterberg district: Messina, *Rogers* 19897 (K., W.); *Moss* and *Rogers* 99 (Z.); *Turner* 12 (P.); Potgietersrust, *Rogers* 1311 (Z.); Warmbaths, *Puttrill* 589 (P.); Pietersburg district: Makapansberge, Strydpoort, *Rehmann* 5536 (Z.); Houtbosch, *Rehmann* 6226 (Z.); Macoustie River, Farm Balloon, *Breyer* (T.M.).

Portuguese East Africa.—Lourenço Marques, *Moss* 11856 (W.); Incanhine, *Schlechter* 12036 (K., Pa., G., Z., V., B., P., B.H., S.A.M., A.M.); Delagoa Bay, *Junod* No. M (Z., G.).

Var. **latifolia** Harv. in Harv. and Sond. Fl. Cap. 2.206 (1861–62); Burtt Davy Fl. Tvaal. 1.2.378 (1932).

Type specimen, *Gueinzius* 616 in Herbarium, Kew.

Leaves 5–8 jugate; leaflets oblong, uncial, retuse, 1·1–3·2 cm. long, 0·5–1·3 cm. broad; longer, broader, thinner and less hairy than *T. polystachya*.

Cape.—Eastern Province: Engcobo Mtn., *Bolus* 8875 (B.H.); Insizwa, *Krook* [*Penther* 2641] (B., V.); near streams in thorns, Scottspoort, *Thode* (B., S.); Port St. Johns, *Moss* 2742 (W.).

Natal.—At Port Natal, *Gueinzius* 616 (K., V.); Richmond district: Bush, Deepdale, *Evans* 102 (N.); Utrecht district: Klipspruit, *Breyer* (T.M.).

Transvaal.—Barberton district: in damp valleys or margins of woods, Brown's Creek, *Galpin* 809 (K., P., B.H., S.A.M.); Barberton, *Thorncroft* 1907 (B.H.); *Thorncroft* [in Herb. *F. A. Rogers* 14217] (P.); Lydenburg district: Spitzkop Goldmines, Lydenburg, *Wilms* 351 (B.M.,B.); Pietersburg district: Shiluvane, *Junod* 2376 (B.); Houtbosch, *Rehmann* 6237 (K., B.M., B.H.); in montibus saxosis, Houtbosch, *Bolus* 10997 (K., P., N., A.M., B.H.); *Schlechter* 4380 (B., B.H., T.M., A.M.); in bush on hills, New Agatha, *McCallum* 137 (Pa., G., P.); in collibus lapidosus graminosisque prope Potgietersrust, *Bolus* 11072 (B.H.); Vallon du Masetane, *Junod* 1124 (K., B., Z., G.,P.); Spelonken, *Junod* 54 (T.M.); Zoutpansberg district: edge of wood, The Downs, *Junod* 1352 (P., T.M.); Magoebas Kloof, *Pole Evans* 3951 (K., P.); Minastone, Louis Trichardt, *Breyer* (T.M.); Hanglip, Louis Trichardt, *Bremekamp* and *Schweickerdt* 389 (P., T.M.).

Swaziland. Mbabane, *Rogers* 11476 (B.H.); Hlatikulu, *Stewart* 93 (K., S.A.M., T.M.).
Portuguese East Africa.—Lourenço Marques, *Quintas* 4 (B.).

An erect shrubby plant bearing a profusion of white, pink or pale mauve flowers. Galpin has a note on his specimen No. 809 that both pink and white flowers were borne on the same peduncle.

16. **T. noctiflora** Bojer in Hort. Maurit. 93 (name only) (1837); Baker in Oliv. Fl. Trop. Afr. 2.112 (1871); Dur. and Syll. Fl. Congol. 132 (1909); De Wild. Comp. Kasai 308 (1910); De Wild. Etudes Fl. Bas-et-Moyen-Congo 3.202 (1910); De Wild. Etudes Fl. Bas-et-Moyen-Congo 5.112 (1912); De Wild. in Bull. Jard. Bot. Bruxelles 4.98 (1914); De Wild. in Bull. Soc. Bot. Belg. 57.123 (1925); Burtt Davy in Fl. Tvaal. 1.2.376 (1932).

Type specimen, *Bojer* (ad margines sylvarum et in agris ins. Zanzibarae, 1830), in Naturhistorisches Museum, Vienna.

Suffruticose. *Stems* diffusely branched, densely silky-pilose with short ascending brown hairs, particularly on the young parts. *Leaves* 5–8-jugate, 7–10 cm. long, subsessile; leaflets narrowly oblanceolate, apex rounded and mucronate, glabrous above, appressedly silky beneath, 1·5–3·5 cm. long, 3–5 mm. broad. *Stipules* linear-subulate, 8–9 mm. long. *Peduncles* terminal and occasionally leaf-opposed, 8·5–25·5 cm. long; racemes laxly flowered; pedicels 3–5 mm. long; bracts lanceolate, short. *Calyx* densely ferruginous-silky, tube 2 mm. long, four upper teeth deltoid, 1·5 mm. long, lowest lobe 2·5 mm. long. *Vexillum* 1·2–1 cm. long, 6 mm. broad, slightly falcate, densely silky-villous with brown hairs.

Transvaal. Barberton district: Komatipoort, *Schlechter* 11809 (K., B.M., Pa., G., Z., V., B.); *Moss* and *Rogers* 505 (W., B.H.); Barberton, *Thorncroft* [Herb. *Rogers* 22661] (Z., B.H.).

Southern Rhodesia. On banks of Umzimgwani River, Doddieburn Ranch, *Davison* 12 (P.) and *Davison* 51 (B.M., P.).

This species also occurs up the East Coast as far as Zanzibar.

17. **T. Dregeana** E. Mey. in Linnaea 7.169 (1832); Ecklon and Zeyher Enum. Pl. Afr. Aust. Extratrop. Pt. 2 (1834–35); Harvey in Harv. and Sond. Fl. Cap. 2.207 (1861–62). O. Kuntze Rev. Gen. Pl. 1.175 (1891); Ann. Bol. Herb. 1.1.15 (1914); Ann. S.A. Mus. 9.4.256 (1915); Ann. Bol. Herb. 3.1.20 (1920); Bak. f. Leg. Trop. Afr. 1.189 (1926).

Syn. *Tephrosia brachyloba* E. Mey. Comm. Drège 110 (1835–36); *Tephrosia Damarensis* Engl. in Bot. Jahrb. 10.29 (1888); Die Veg. der Erde. 9.3.588 (1915); *Tephrosia Dinteri* Schinz in Vierteljahrsschr. Nat. Ges. Zurich 52.423 (1907).

Type specimen, *Drège* s.n., in Botanisches Museum, Berlin-Dahlem. •

Suffruticose, branching from the base. *Stems* woody at base, rigid, striate, thinly appressedly hairy. *Leaves* 1·3–8 cm. long, 2–4-jugate, petiolate; leaflets linear-lanceolate, pale green above, thinly appressedly pubescent beneath, 0·8–8·5 cm. long, 1–8 mm. broad. *Stipules* 2–8 mm. long, narrow subulate, acuminate. *Peduncles* 3·5–38 cm. long, leaf-opposed and terminal, laxly flowered. *Flowers* small, 5–6 mm. long; pedicels 3–7 mm. long. *Calyx* thinly appressedly hairy, two upper lobes very small, three other lobes about equal (1·5–2 mm. long) and about equal to the length of the calyx-tube. *Vexillum* orbicular, 5 mm. long and broad, thinly hairy without; carina and alae 4·5–5 mm. long, 1·5–2 mm. broad. *Ovary* 3 mm. long, pubescent. *Style* 2 mm. long, glabrous. *Pod* curved, 3–4 seeded, 1·5–3 cm. long, 3–4 mm. broad, sub-glabrous, pale yellowish-green.

South West Africa.—Otavi, *Dinter* 5486 (D. Coll.); Inachab, *Dinter* 1154 (Z., B.) [type of *T. Dinteri* Schinz]; Koes Riedmond, *Pfiel* 138 (B.); between Ausis and Khuias, *Schenck* 62 (Z.), Lichtenstein, *Dinter* 4247 (D. Coll.); Utschoa, *Prager* 61 (B.); granite slopes at Welwitsch, March, *Pearson* 4417 (K.); Welwitsch, *Galpin* and *Pearson* 7620 (K., S.A.M., P.), and *Galpin* and *Pearson* 7628 (K.); on rocky mtns. at Natamas, *Lindner* (Z.), Damarabezirk Namib Kau Tal Sandige Keissteppe, *Engler* 6056 (B.); Haikamchab, *Galpin* and *Pearson* 7613 (K., S.A.M., P.); near Hykamhab, *Marloth* 1210 (K., S.A.M., P., B.H.), Wustenmunsale ca. 50 Km. ostl. Swakopmund, *Dinter* 6699 (D. Coll.); Rossing, *Boss* A104 (T.M.); Langer Heiririch Granitberge, *Boss* A89 (T.M.); Okahandja-Otjisani, *Dinter* 1567 (D. Coll.), *Dinter* s.n. (B.); Quickborn, Okahandja, *Bradfield* 398 (P.); Okahandja, *Dinter* 568 (B.); Windhoek, *Gillman* 123 (S.A.M.); *Pearson* 9775 (K., B.H.); *Fermer* 28 (B.); Rehoboth, *Fleck* 683 (Z.); Naukluft Mtns., river bed between Nautzurus Noab and Gous Kouchas, *Pearson* 9078 (K.); between Gelwater and Gt. Fish River, *Pearson* 9222 (K., S.A.M., B.H.); Gt. Karas Mtn., E. of Hoboog, *Pearson* 9757 (K., B.H.); Gt.

Karasberg Ravine on Kleiap River 5 miles S.E. of Wasserfall, *Pearson* 7891 (K., B.M., A.M., N., B.H., S.A.M.); nach Garub Zu Krusses, 1400 m., *Dinter* 3705 (D. Coll.); Garub, *Range* 261 (B.); Kubus Klippdachs River, *Engler* 6735 (B.); Keetmanshoop, *Fenchel* 1921 (Z.); *Fleck* 682 (Z.); Kalkfontein, *Schafer* 15 (B.); In arenosis prope Aais, *Marloth* 4773 (B., P., S.); Aias, *Prager* 621 (B.), sand south of Warmbad, *Pearson* 5031 (K., B.H.), Klein Karas, *Ortendahl* 224 (P.); *Schafer* 57 (B.), common in valleys N. of Sabiesis, *Pearson* 4113 (K.); near Grundoorn, *Pearson* 4576 (K., B.H.); dry shale banks, Gt. Fish River, *Pearson* 9263 (K., B.H.).

Cape.—Little Namaqualand.—dry sandy bed of Oorlap River, Richtersveld, *Herre* (S.); 11867 (S.); sides of dry bed of Koodas River, *Pillans* 5530 (B.H.); dry water courses between hills S.E. Sendling's Drift, *Pillans* 5098 (B.H.), dry sandy bed of river at Anisfontein, *Pillans* 5500 (B.H.); sandy soil S. of Viool's Drift, *Taylor* 1178 (B.H.), sandy flats near Viool's Drift, Orange River, *Thorne* (S.A.M.); shale hills N. of Rooival near Orange River, *Pillans* 6410 (B.H.); near Ramans Drift, *Pearson* 4021 (K.), near Garieptitiones, Beaufort, *Drège* (K., B.M., Pa., G., B.); Great Bushmenland, common in dry river beds near Pella, *Pearson* 3556 (K.); Herbert district: Honeynest Kloof Kop near Station, *Victor* [Herb. No. 1474] (Km., K., T.M.), on koppie among stones, Honeynest Kloof Station, *Victor* 983 (Km.); the berg above the Kloof, Campbell, *Wilman* 1473 (Km.); The Koppen, Roopoort, *Wilman* 2267 (A.M., Km.); Barkly West district: on the hills, Newlands, *Wilman* 3222 (Kim., B.H.); Hay district: Klipfontein, *Wilman* (B.H.); Bushmans district: Bushmans Fountain, *Wilman* (B.H.); Prieska district: Prieska, *Bryant* 361 (P.); Gathand around Prieska, *Bryant* 1086 (K.); Prince Albert district: Prince Albert Road, *Thoday* and *Delf* 102 (S.). No definite locality: *Drège* 413 (V.); *Hennegart* 92 (Pa.).

18. **T. pallens** (Ait.) Pers. Syn. 2.329 (1807); DC. Prodr. 2.254 (1825); Sprong. Syst. Veg. 3.235 (1826); Ecklon and Zeyher Enumm. Pl. Afr. Aust. Extratrop. 247 (1835); Steudel Nomen. Bot. 666 (1840); Harvey in Harv. and Sond. Fl. Cap. 2.205 (1861–62); O. Kuntze Rev. Gen. Pl. 1.185 (1891); Wood Fl. of Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Bews Fl. Natal and Zululand 111 (1921).

Syn. *Galega pallens* Ait. Hort. Kew. 3.71 (1789); Linn. Syst. Nat. ed. 13 per Gmelin 2.11.1129 (1792); Willd. Sp. Pl. 3.11.1245 (1803); Linn. Syst. Nat. 6.1215 (1806); *Galega humilis* Thunb. Prodr. 134 (1800); *Tephrosia angulata* E. Mey. Comm. 109 (1836).

Type specimen, *Thunberg* s.n., in Thunberg's Herbarium, Uppsala, Sweden.

Suffruticose. *Stems* erect or ascending, angularly bent, rib striate, pubescent. *Leaves* shortly petiolate, 4–8 jugate, 2–6 cm. long; leaflets narrow, cuneate oblong, mucro recurved, striolate and thinly pubescent, dark green above, silky and pale green below, 0·8–2·5 cm. long, 0·2–0·7 cm. broad. *Stipules* subulate, 3–6 mm. long. *Peduncles* terminal and leaf opposed, angular, furrowed, 6–19 cm. long. *Flowers* about 1 cm. long. *Calyx* subequally 5-toothed. *Vexillum* subrotund, sericeous or pubescent without. *Style* glabrous. *Legume* 3·5 cm. long, 0·3 cm. broad, linear, flat, velvety pubescent.

Cape.—Graaff Reinet district: on Sneeuwberg, *Wallich* (B.M., G.); Somerset East district: Somerset, *Bowker* (K.); Uitenhage district: near Olifantshoek, *Ecklon* and *Zeyher* 5728 (B.); *Zeyher* s.n. (S.A.M.); near Olifantshoek and Bushman's River, *Ecklon* and Zeyher (K., B.M., O., Pa., Z., V.,G., B., P., S.A.M.); Albany district: on plains of Albany, *Bowie* 10 (B.M.); Albany, *Alexander* 104 (K.); Howisonspoort pone Grahamstown, *Zeyher* 2708 (Pa., S.A.M.); Grahamstown, *Robertson* (P.); Longmore Forest Reserve, *Long* 1036 (K.); in lapidosis ad ped. Bothasberg, *MacOwan* 178 (K., B., Pa., N.,A.M.); Alexandria, *Galpin* 10813 (K., P., B.H.); *Galpin* 10638 (K., P., B.H.); *Burtt Davy* 12101 (P.); Kleinemond, *White* 967 (Z., A.M.); Bathurst district: Bathurst, *Rogers* (A.M.); Port Alfred, Kowie, *Tyson* (P., T.M., S.). No definite locality, *Drège* 2708 and 407 (V.); *Thunberg* (U.); *Banks* (V.); *Drège* in Herb. Meyer 6697 (B.).

19. **T. delagoensis** H.M. Forbes sp. nov., affinis *T. Dregeanae* E. Mey., sed foliolis brevioribus, fructubus differt

Suffrutex erectus. *Caules* ramosi. *Folia* 3–8-jugata, 2–5·5 cm. longa; foliola oblanceolata, 0·8–1·8 cm. longa, 2–5 mm. lata, retusa, mucronata, supra glabra, subtus appresse pubescentia; stipulae subulatae, 3–4 mm. longae, nervatae. *Flores* circiter 1 cm. longi; pedicelli 3–4 mm. longi; dentes calycis tubo longiores. *Fructus* angustus, planus, 3–4·5 cm. longus, 3 mm. latus, apice leviter falcatus, parce pubescens.

Type specimen, *Schlechter* 11521 in National Herbarium, Pretoria.

Suffruticose. *Stems* erect, branching, woody. *Leaves* 3–8-jugate, 2–5·5 mm. long, shortly petioled; leaflets oblanceolate, mucronate, retuse, glabrous above, appressedly pubescent below, 0·8–1·8 cm. long, 2–5 mm. broad. *Stipules* subulate, 3–4 mm. long, nerved. *Peduncles* terminal and leaf-opposed, laxly flowered; bracts short, linear; pedicels 3–4 mm. long. *Calyx*-tube about 3 mm. long, lobes 3–4·5 mm. long. *Vexillum* 1 cm. long, 6 mm. broad, pubescent without. *Ovary* pubescent, 4 mm. long. *Style* 2–5 mm. long, flattened, glabrous. *Legume* narrow, apex slightly falcate, 3–4–5 cm. long, 3 mm. broad, thinly pubescent.

Portuguese East Africa.—In arenosis Lourenço Marques, *Schlechter* 11521 (K., P., A.M., B.H.).

20. **T. amoena** E. Mey. Comm. Pl. Afr. Aust. 109 (1836); Harvey in Harv. and Sond. Fl. Cap. 2.206 (1861–62); O. Kuntze Rev. Gen. Pl. 1.174 (1891); Wood Fl. Natal 41 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Bews Fl. Natal and Zululand 110 (1921).

Type specimen, *Drège*, in Botanisches Museum, Berlin-Dahlem.

Fruticulose. *Stems* erect, branching, branches very slender, subfastigiate. *Leaves* shortly petiolate, 7–9-jugate, subrecurved-patulate, 2·5–6 cm. long; leaflets 2–5 mm. broad, up to 1·5 cm. long, cuneate-linear, obtuse, subtruncate or mucro-recurved, glabrous above, appressedly hirsute below. *Stipules* subulate, 3–6 mm. long. *Peduncles* axillary and terminal, slender, 4–13 cm. long, laxly racemose. *Flowers* about 7·5 mm. long, usually in pairs. *Pedicels* longer than the bracts, 3–7 mm. long. *Bracts* subulate, 2–3 mm. long. *Calyx*-tube 2 mm. long, 5·5 mm. in diam., lobes unequal, 1–2 mm. long, upper two slightly connate. *Vexillum* silky without, about 7 mm. long and broad. *Ovary* silky, 4 mm. long. *Style* glabrous, 3 mm. long. *Legumes* narrow, pubescent or glabrescent.

Cape. Queenstown district: Queenstown, *Page* (B.H.); Pondoland district: grassy fields above Ngogwane Falls, Lusikisiki, *Galpin* 9531 (K., P.); Omsameaba, *Drège* (B.); Pondoland, *Drège* (K., V.).

Natal. Umkomaas district: Umkomaas, *Wylie* (N.); Zululand, Ntondweni, *Wood* 10938 (A.M.); no definite locality, *Wylie* (Pa.).

South Africa.—No definite locality, *Drège* 408 (D.,V.); *Drège* 5466 (B.).

21. **T. Medleyi** H.M. Forbes sp. nov., affinis *T. amoenae* E. Mey., sed foliolis latioribus longioribusque, floribus majoribus differt.

Suffrutex caulibus erectis glabris vel parce pubescentibus. *Folia* 4–8-jugata, 3–7 cm. longa; foliola cuneato-oblonga, 1–2·5 cm. longa, retusa, mucronata, utrinque glabra vel subtus parce pubescentia; pedunculi terminales axillaresque, usque 9 cm. longi; bracteae ovato-acuminatae, caducae, 5 mm. longae. *Flores* 1·5 cm. longi; dentes calycis tubo excedentes; stylus pilosus.

Type specimen, *Wood* 5984, in Natal Herbarium, Durban.

Suffruticose. *Stems* erect, branching, glabrous or very sparsely pubescent. *Leaves* 4–8-jugate, shortly petioled, 3–7 cm. long; leaflets cuneate-oblong, retuse, mucronate, glabrous on both sides or very sparsely pubescent below, 1·2·5 cm. long, 0·5 0·8 cm. broad; petiolules about 1·5 mm. long, more or less densely pubescent. *Stipules* subulate-acuminate, 0·5–1 cm. long. *Peduncles* terminal and axillary, up to 9 cm. long, few-flowered at apex. *Bracts* ovate-acuminate, 5 mm. long, soon caducous. *Calyx* teeth linear-lanceolate, longer than the tube, lowest longest. *Style* bearded. *Legumes* not seen.

Natal.—Krantzkop district: near Greytown, *Wood* 5984 (N.).

This is, apparently, a slender shrubby plant. The stems, petioles, stipules and bracts are a dark reddish colour and the veining on the lower surface of the leaflets is also a dark brown. The flowers are pink.

This plant has been named in honour of the late Dr. Medley Wood, one of the great pioneer botanists of Natal.

22. **T. discolor** E. Mey. Comm. Pl. Afr. Aust. 1.1.110 (1836); Harvey in Harv. and Sond. Fl. Cap. 2.207 (1861 62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Wood Fl. of Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Bews Fl. Natal and Zululand 111 (1921); Bak. f. leg. Trop. Afr. 1.189 (1926).

Type specimen, *Drège* s.n., in Botanisches Museum, Berlin-Dahlem.

Suffruticose. *Stems* erect, slender, virgate, angular, rib-striate, canescent. *Leaves* 1·6-jugate, shortly petiolate, 1 3 cm. long; leaflets linear, subobtuse, margins thickened, mucro recurved, glabrous and green above, more or less densely canescent beneath, 1·2 3·5 cm. long, 1–3·5 mm. broad. *Stipules* subulate, 3–6 mm. long, pedicels 3 mm. long. *Calyx* silky, tube 5 mm. in diam., 2·5–3 mm. long; lobes narrow, acuminate, unequal, 2·5–4·5 mm. long. *Vexillum* 1 cm. long, 6 mm. broad. *Ovary* 5·5 mm. long, densely silky. *Style* 3·5 mm. long, glabrous. *Legumes* 5·5 cm. long, 3–4 mm. broad, narrow-linear, fulvous-pubescent, many-seeded; seeds small, dark brown.

Natal.—Grassy places near Port Natal, *Drège* (K., Pa., O., G., B., P.); *Gueinzius* (K., B.M., P.); Natal, *Gerrard* 756 (K., P.); Durban Flat, *Wood* (N.); *Wood* 3127 (K.); near Durban, *Wood* 5586 (G.); *Wood* 6373 (P.); *Wood* (N.); *Wood* 9565 (B., S.A.M.); no definite locality, *Drège* 414 (V.); *Gerrard* and *McKen* 419 (N.).

Portuguese East Africa.—Delagoa Bay, *Junod* 179 (G., Z.).

23. **T. euchroa** Verdoorn in Bothalia 3.239 (1937).

Type specimen, *Obermeyer, Schweickerdt* and *Verdoorn* 73, in National Herbarium, Pretoria.

Small suffrutex more or less 30 cm. high, many-branched, erect or branches decumbent. Branches cano-pubescent, glabrescent. *Leaves* imparipinnate, 2 6-jugate; leaflets oblanceolate-oblong or oblong, 0·9 3 cm. long, 3 9 mm. broad, cano-pubescent on both sides, upper at length glabrescent, apex minutely mucronate or retuse, petiolate, petiolules 3 mm. long, densely cano-pubescent. *Stipules* lanceolate, acute, 3 5 mm. long, cano-pubescent, 3-nerved. *Racemes* 3·5 11·5 cm. long, terminal, longer than the leaves, laxly flowered, lower flowers sometimes in axils of upper leaves. *Flowers* 1·5 2 cm. long, reddish, 1 3 together, pedicels 3 5 mm. long; bracts lanceolate, acute, cano-pubescent, 3 4 mm. long, 1·5 mm. broad. *Calyx* cano-pubescent, tube 6 mm. in diam., 2 mm. long, lobes triangular, narrow, acute, unequal, 1·5 3·5 mm. long. *Vexillum* appressedly pubescent without, suborbicular, 1·5 2 cm. long and broad, with two small swollen appendages at apex of claw. *Ovary* 5 mm. long, densely pubescent. *Style* glabrous *Legumes* linear, appressedly cano-pubescent, 3–3·5 cm. long, 3 mm. broad.

Transvaal. Zoutpansberg district: rocky slope, N.W. slopes, Zoutpansberg, *Obermeyer, Schweickerdt* and *Verdoorn* 73 (P., T.M.); among rocks, lower slopes of Zoutpansberg, *Schweickerdt* and *Verdoorn* 529 (B.M., P.); Messina, *Young* [14565 in Herb. Moss] (W.); *Young* [14566 in Herb. Moss] (B.M., W.); *Rogers* 23664 (P., W.); Waterval Boven, *Mason* (K.); no definite locality, *Rogers* 15651 (B.H.).

This is very distinct from all the known Transvaal species of *Tephrosia*. The silvery-grey colour of the bush and the pinkish-red flowers suggested the specific name. It is somewhat like *T. noctiflora* but has much larger flowers. The flowers of each raceme develop at different intervals and one finds several large open flowers while the buds above are still very immature. [Verdoorn in Bothalia 3.2.239 (1937).]

24. **T. pallida** H. M. Forbes sp. nov., affinis *T. euchroae* Verdoorn, sed foliolis minoribus glabris supra pallido-viridibus, pedunculis longioribus differt.

Suffrutex caulibus erectis canescentibus. *Folia* 5–9-jugata, 7–13·5 cm. longa; foliola oblanceolata, mucronulata, 0·8–1·8 cm. longa, 0·4–0·5 cm. lata, subtus canescentia supra pallida glabraque, marginibus involutis; stipulae lineari-sublatae, 3–4 mm. longae; pedunculus 18–35 cm. longus, laxiflorae; bractae lineares; stylus glaber. *Fructus* 4·5 cm. longus, 0·4–0·5 cm. latus, apice leviter falcatus, parcissime pubescens.

South West Africa.—Stingbank, legit *E. G. R. Erdaile*, Com. *Rogers* 15386 in Herb. Arium Kew, Type.

Suffrutex. *Stems* erect, branching, striate, densely canescent. *Leaves* 5–9-jugate, long petioled, 7–13·5 cm. long, petiole 1·5–2·5 cm. long before first pair of leaves, internodes between leaflets 1–1·5 cm., leaflets oblanceolate, shortly mucronate, mucro recurved, margins involute, densely canescent below, pale and glabrous above, 0·8–1·8 cm. long, 4–5 mm. broad; petiolules 1–2 mm. long. *Stipules* linear-lanceolate, 3–4 mm. long. *Peduncles* terminal, 18–35 cm. long, laxly flowered, flowers 2–3-nate. *Calyx* canescent, lobes longer than tube. *Style* glabrous; ovary densely canescent. *Legume* 4·5 cm. long, 4–5 mm. broad, linear, slightly falcate towards apex, thinly pubescent, 7–8-seeded.

Only one specimen of this plant was seen. It appears to be a fairly tall shrubby plant, densely canescent in all parts.

25. **T. Kraussiana** Meisn. in Hook. Lond. Journ. Bot. 2.87 (1834); Cape Plants, Krauss and Engler 54 (1846); Harvey in Harv. and Sond. Fl. Cap. 2.206 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Wood and Evans Natal Plants 3. pl. 249 (1901); Wood Fl. of Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 2.147 (1908); Bews Fl. Natal and Zululand 111 (1921); Watt and Breyer-Brandwyk Med. and Pois. Pl. S.A. 74 (1932).

Type specimen, *Krauss* 40, in Herbarium, Kew.

Fruticose, branches straight, erect, sulcate or angular, especially at the extremity, densely leafy. *Leaves* shortly petiolate, 2·5–3·8 cm. long, 6–12-jugate; leaflets 0·8–3·6 cm. long, 2–6 mm. broad, linear, usually complicate, very shortly mucronate, mucro recurved, glabrous or very thinly pubescent above, more densely pubescent below. *Stipules* linear-setaceous, longer than the petiole, pubescent, 0·5–1·3 cm. long. *Peduncles* terminal and in axils of upper leaves, simple or branching, laxly racemose, 5–14 cm. long. *Flowers* 0·7–1 cm. long, 2–3 together in axils of setaceous bracts, pedicellate. *Calyx*-tube 6–7 mm. in diam., 2–3 mm. long, lobes lanceolate, acuminate, unequal, 1–4 mm. long, whole calyx pubescent. *Vexillum* pubescent without, 0·75–1 cm. long, 6–8·5 mm. broad. *Ovary* 4·5–6 mm. long, densely silky. *Style* glabrous. *Legumes* narrow, linear, thinly canescent, 3–3·5 cm. long, 4 mm. broad.

Cape Province.—East London district: sandy grassy places, East London, *Thode* (S.); *Rattray* 297 (A.M.); hillside near Kentani River Mouth, *Galpin* 6549 (A.M., P.); Komgha district: grassy hills near Kei Mouth, *Flanagan* 48 (P., B.H., A.M., S.A.M.): Pondoland: no definite locality, *Bachmann* 614 (K., B.M., Z., B.).

Natal.—Port Shepstone district: Margate, *Rump* (N.); sandy grassy places, Beach Terminus, *Thode* (B., S.); Ixopo district: farm Friedenau, Dumisa, *Rudatis* 821 (K., B.M., V., G., Z., B., P.); *Rudatis* 257 (K., B.M., Pa., B., P.); Durban district: Port Natal, *Krauss* 49 (K., B.M., G., P.); *Gueinzius* 17 (Pa., Z., S.A.M.); Coastland, *Sutherland* (K.); Clairmont, *Wood* (G.); Durban, *Wood* 9983 (N.); *Wood* (A.M.); *Wood* 6260 (B., Z., P.): Sydenham near Durban, *Wood* 225 (K., B.M., B., N., S.A.M., A.M., B.H.); Palmiet near Durban, *Wood* 8427 (Pa., N.); *Wood* 10924 (Z., N., W.); Pinetown district: New Germany, *Wood* 12695 (N., T.M.); Bothas Hill, *Wood* 10262 (P., T.M.); Inanda district: Inanda, *Wood* 807 (K., S.A.M.); and 807 A (K., B.M.); near Umzinyati Falls, *Haggarth* [Herb. *Wood* 4717] (G., Z.); Chakas Kraal, *Thode* (S.); Nonoti, *Wood* 8733 (B., Z.); *Wood* 9207 (N.); Zululand, Entonjaneni, *Gerstner* 3687 (N.). No definite locality, *Gerrard* 642 (B.M.); *Gerrard* 1079 (K., B.M.); *Gerrard* 724 (K.); *Gerrard* and *McKen* 352 (K., B.M., Pa., V.).

Swaziland.—Kubuta Estate, Hlatikulu, *Pierce* 14 (P.).

The Zulus know this plant as "inSangwana" or "isiPhungo" and they make a warm infusion of the root as a remedy for a troublesome night cough.

26. **T. sparsiflora** H. M. Forbes sp. nov., affinis *T. purpureae* (L.) Pers., sed foliolis minoribus, caulibus gracilioribus, floribus paucis minoribus differt.

Caules erecti vel ascendentes, pubescentes. *Folia* 3–5-jugata, 2·5–4·5 cm. longa; foliola oblonga-cuneata, mucronata, 0·8–2·5 cm. longa, 0·5–1·3 cm. lata, utrinque appresse pubescentia; stipulae setaceae, 4 mm. longae; pedunculi 8–16 cm. longi; bracteae setaceae, 2 mm. longae. *Flores* pauci, 5 mm. longi; dentes calycis tubo aequilongi; stylus glaber. *Fructus* linearis, 3–3·5 cm. longus, 0.4 cm. latus, parce breviterque appresse pubescens, apice leviter falcatus.

Type specimen, *Repton* 1614, in National Herbarium, Pretoria.

Stems erect or ascending, pubescent. *Leaves* 3–5 jugate, 2·5–4·5 cm. long, very shortly petioled; leaflets oblong-cuneate, mucronate; appressedly pubescent on both sides, 0·8–2·5 cm. long, 0·5–1·3 cm. broad. *Stipules* setaceous, 4 mm. long. *Peduncles* 8–16 cm. long, terminal and leaf-opposed, very laxly flowered, flowers 1–2 together. *Bracts* setaceous, 2 mm. long. *Flowers* 5 mm. long, "pinkish". *Calyx* teeth subequal to tube. *Style* glabrous. *Legumes* linear, 3–3·5 cm. long, 0·4 cm. broad, slightly and shortly appressedly pubescent, apex slightly falcate.

Transvaal.—Pretoria district: Wonderboom Reserve, S. side of Magaliesberg, *Repton* 1614 (P., N.); Marico district: Zeerust, *Thode* A. 1392 (P., N.).

Bechuanaland.—Vryburg, *Mogg* 4902 (P.).

27. **T. polystachyoides** Bak. f. Leg. Trop. Afr. 1.193 (1926); Burtt Davy Fl. Tvaal. 1.2.378 (1932).

Type specimen, *Teague* 14, in Herbarium, Kew.

Suffruticose. *Stems* erect, branching, often rufo-tomentose above. *Leaves* 5–17-jugate; leaflets 1·5–3 cm. long, 0·5–1·2 cm. broad, oblong or elliptic, apex shortly mucronulate, mucro recurved, glabrous or thinly appressedly pubescent above, more or less densely pubescent below, pubescence white or tawny. *Stipules* 4–6 mm. long, linear. *Peduncles* 6–30 cm. long, laxly racemose. *Flowers* 0·8–1·5 cm. long, 3–4 together, lowest flowers sometimes in axils of upper leaves; pedicels 3–5 mm. long; bracts linear. *Calyx* densely long pilose, lobes linear-lanceolate, much longer than the tube. *Style* glabrous. *Legumes* 3–3·8 cm. long, 3–4 mm. broad, falcate, densely tawny pubescent.

Transvaal. Pretoria district: Derdepoort, *Rehmann* 4778 (K., B.M.); Rietfontein, *Venter* (Pa., P.); Pretoria, *Fouche* (P.); Silkaats Nek, *van Dam* (T.M.); Saltpan, *Leeman* (T.M.); Wonderboompoort, Schlechter, 4164 (K., B.M., Pa., G., B.H., V., A.M.); *Leendertz* 703 (B.H., T.M.); *Thode* A 408 (K., P., N.); *Smith* 1656 (P.); 1932, *Smith* 6202 (K., P., N.); 1932, *Smith* 6203 (P., V.); Barberton district: Pyramid Estate near Potgietersrust, *Galpin* 8958 (P.); Griffin Mine, *Breyer* (T.M.); Kaapsche Hoop, *Rogers* 20834 (K., Pa., P., T.M.); Nelspruit, *Breyer* (T.M.); *Liebenberg* 2466 (P.); Rustenburg district: stony koppie S.W. of town, Rustenburg, *Nation* 156 (K., B.H.); *Nation* 164 (B.H.); *Fouche* 23 (P.); Pietersburg district: Houtbosch, *Rehmann* 6238 (K., B.M., Z.); *Schlechter* 4400 (B., B.H., A.M., T.M.); Pietersburg, *Rogers* 14644 (K.); in graminosis prope pagum Pietersburg, *Bolus* 10912 (K., P., B.H., A.M.); Gravelotte, *van Dam* in Tvl. Mus. 25040 and 25041 (T.M.); Rooikop, *Pole Evans* 1261 (K., P.).

Rhodesia. Umtali Div.; Marico district: Odanzi River Valley, *Teague* 14 (K., B.H., P.); Salisbury, *Eyles* 2050 (Pa., P., S.A.M.); Ses-Heke, Barotseland, *Borle* (P.); Mazabuka, *Rogers* 26147 (T.M.).

28. **T. Ehrenbergiana** Schweinf. Beitr. Fl. Aethiop. 18 (1827): Bak. f. Leg. Trop Afr. 1.209 (1926); Klotzsch in Peters Reise Mossamb. Bot. 576 Corrigenda (1863).

Syn. *Tephrosia villosa* sec. Bak. f. Leg. Trop. Afr. 1.208 (1926) non (L.) Pers.; Baker in Oliver Fl. Trop. Afr. 2.122 (1871) pro parte; Die Veg. der Erde 9.3.589 (1915); *Cracca villosa* sec. Hiern in Cat. Afr. Pl. Welw. 1.223 (1896), non Linn.; *Cracca villosa* L. var. *incana* sec. Hiern in Cat. Afr. Pl. Welw. 1.223 (1896), non O. Ktze; *Tephrosia Apollinea* sec. Klotzsch in Peters Reise Mossamb. Bot. 47 (1861) non (Del.) DC.; sec. Eyles in Trans. Roy. Soc. S. Afr. 5.4.375 (1916) non (Del.) DC. pro parte. *Tephrosia rhodesica* Bak. f. Leg. Trop. Afr. 1.208 (1926); Burtt Davy Fl. Tvaal. 1.2.378 (1932): *Tephrosia incana* sec. Bak. in Oliv. Fl. Trop. Afr. 2.123 (1871) excl. syn. pro parte, non Graham; Die Veg. der Erde 9.3.589 (1915).

Stems erect, branching, yellow-villous. *Leaves* 9–10 cm. long, 5–9-jugate; leaflets 2 3·7 cm. long, 0·6–1·2 cm. broad, narrow oblong, apex obtuse or emarginate, mucronate, upper surface thinly, lower surface densely pubescent. *Stipules* linear, 0·5–1 cm. long. *Peduncles* terminal and lateral, 11 18 cm. long, laxly-flowered, lower flowers 3–4 together. *Flowers* shortly pedicellate, about 1–1·2 cm. long. *Calyx* densely silky, tube 7–8 mm. broad, 2·5 3 mm. long, lobes more or less sub-equal, linear-subulate, 4–6 mm. long. *Vexillum* ovate or suborbicular, 1 1·2 cm. broad, 1 1·1 cm. long, densely silky on the back. *Ovary* densely silky, 6 6·5 mm. long. *Style* glabrous 4–5 mm. long. *Pod* pubescent, falcate, 4 cm. long, 0·5 cm. broad.

South West Africa. Grootfontein, *Schoenfelder* 948 (D. Coll); Gaub Gneissburg, *Dinter* (B.); Okahandja, *Dinter* 4608 (D. Coll.); auf sandalluv in Okahandja River, *Dinter* II 13. (B.); Karibib Landsternhuzel, *Dinter* 6915 (D. Coll); Karibib am Damm von Roseman's farm Okongawa, *Dinter* 6808 (D. Coll.); Amerb. Gramtbanke, *Dinter* 6852 (D. Coll.); Uaobos in zu Kuimfulsu, *Dinter* 1413 (B.); Omburo Platze am Rivier, *Dinter* 1409 (B.); Kaross, *Thorne* (S.A.M.).

Transvaal. –S.A. Gold Fields, *Baines* (K.); Waterberg district: Messina, *Rogers* 19242 (K., P.); *Rogers* 20813 (T.M.); *Rogers* 20984 (Wits., Z.); Rooikop, *Pole-Evans* 1261 (Pa.); Palala River, *Breyer* (T.M.).

Rhodesia.—Mazabuka, *Rogers* 26147 (T.M.); Deka River, Wankie, *Eyles* 7962 (K.); Victoria Falls, *Rogers* 5558 (K., B.H.); Bulawayo, *Eyles* 1062 (K., A.M.) [*Type* of *T. rhodesica* Bak. f.]; *Borle* 162 (K., Z., P.); Odanzi River Valley, Umtali, *Teague* 435 (K., B.H., S.); Que Que, *Mcleod* 52 (K., Pa.).

This species also occurs in Angola, Portuguese East Africa and Tanganyika.

Tephrosia villosa (L.) Pers. and *T. incana* Graham are Indian species which, in their typical form, do not occur in Africa. African material placed under the above species by various authors, l.c., are referable to the Tropical African *T. Ehrenbergiana* Schweinf.. *T. rhodesica* Bak. f. exhibits no striking differences from *T. Ehrenbergiana* Schweinf. except in the colour of the indumentum. This, however, appears to be variable, for Schweinfurth, l.c. 19, states the pubescence of the specimens he examined to be silvery white and in parts, as a result of drying, somewhat brownish.

T. villosa (L.) Pers. is based on *Galega villosa* L., which in turn is based on a figure in Burm. Thes. Zeyl. 73 t. 33 (1737). Unfortunately, there is no specimen of *Galega villosa* L. in the Linnean Herbarium. Burmann's figure represents a species which is more slender and smaller in most parts than the African material usually incorrectly identified with this species. Modern gatherings of the true Indian plant in the Herbarium, Kew, confirm this statement.

T. incana Graham has already been stated by Baker, l.c., not to occur in Africa.

T. Apollinea (Del.) DC. is an Egyptian plant which apparently does not occur in Southern Africa. It is likewise a more slender species with smaller and far less densely pubescent vegetative and reproductive parts than typical *T. Ehrenbergiana*. The plants referred to *T. Appollinea* by Klotzsch l.c. and Eyles l.c., should be placed under *T. Ehrenbergiana*.

29. **T. oxygona** Welw. in Oliv. Fl. Trop. Afr. 2.114 (1871); Engl. Bot. Jahrb. 9.29 (1888); Die Veg. der Erde 9.3.588 (1915); Bak. f. Leg. Trop. Afr. 1 (1926).

Type specimen, *Welwitsch* 2104, in Herbarium, Kew.

An erect shrub, 3–4 ft. high, branching freely; stems argenteo-canescent. *Leaves* 8·5–15·5 cm. long, 5–10 jugate (13–19-jugate in Fl. Trop. Afr.); leaflets 1–3·5 cm. long, 0·5–2 cm. broad, obovate-oblong, coriaceous, mucronate, canescent on both surfaces, densely when young, more thinly and sparsely when older, veining on lower surface tawny, distinct and slightly raised. *Stipules* linear, rigid, 2 7 mm. long. *Peduncles* axillary and terminal, laxly flowered, 12 27·5 cm. long. *Flowers* approximately 1·5 cm. long. *Pedicels* 2 5 mm. long, longer than the linear bracts. *Calyx*-tube 3 mm. long, 7 mm. in diam., lobes unequal, two upper deltoid-cuspidate, about 1·5 mm. long, lower lanceolate, about equalling the tube in length. *Vexillum* silky without, 1·5 cm. long and broad. *Ovary* silky, 7 mm. long. *Style* glabrous, 4 mm. long, flattened, penicillate at apex. *Pods* curved, 4·5–6 cm. long, glabrescent.

Angola.—*Welwitsch* 2104 (K., Pa., B.); river bed in open at Kin on the Mossamedes Railway, *Pearson* 2393 (K., B.H., B.); Mossamedes, *Welwitsch* 21110 (K.).

South West Africa.—Damaraland: in arenosis Otyimbinque, *Marloth* 1382 (B., S.A.M., P., B.H.); between Kaientes and Kaross, *Thorne* (S.A.M.); Kaurasib River west of Otavi, *Barnard* (S.A.M.); Wilhelmeshal, Okahambia, *Dinter* 563 (B.); Toles River, *Dinter* 2085 (B.); Namaqualand: Namib bei Klawami, *Belek* 54 B (B.); no definite locality, *Dinter* 1410 (B.).

30. **T. zoutpansbergensis** Bremekamp in Ann. Tvaal. Mus. 15.2.242 (1933); Bothalia 3.2.239 (1937).

Type specimen, *Bremekamp* and *Schweickerdt* 279, in Herbarium, Transvaal Museum, Pretoria.

Suffruticose, stems erect, densely sericeo-pubescent. *Leaves* 2–4 jugate, petiolate, petioles 1·5 2 cm. long; terminal leaflet shortly petiolate, petiole 3 mm. long; leaflets broadly lanceolate or oblanceolate, 1·5–4·5 cm. long, 0·5–1·5 cm. broad, base acute, apex obtuse, mucro minute, recurved, sericeous when young, sparsely pubescent when older;

common petiole 2–4·5 cm. long, stout. *Stipules* filiform, pubescent, 2–4 mm. long. *Racemes* terminal, densely many-flowered, flowers binate, lower in axils of reduced leaves (1–2-jugate or simple), others in axils of deciduous filiform bracts, both rhachis and calyces densely sericeous-villous. *Flowers* 1·5 cm. long, shortly pedicellate, pedicels with minute bracteoles. *Calyx* tube campanulate, 1 cm. in diam., 3 mm. long, lobes subulate to subulate-ovate, unequal, 1·7–8 mm. long. *Vexillum* unguiculate, reniform, pubescent without, 1–1·4 cm. broad. *Ovary* sericeo-villous, 8 mm. long. *Style* dorsiventrally flattened, inconspicuously glandulose, 4–4·5 mm. long, stigma penicillate. *Legume* ovoid or oblong, 1·2–1·5 cm. long, 6–7 mm. broad, obliquely apiculate, densely pubescent.

Transvaal. Zoutpansberg district: Zoutpan, Zoutpansberg, *Bremekamp* and *Schweickerdt* 279 (P., T.M.); lower slopes of Zoutpansberg, *Obermeyer*, *Schweickerdt* and *Verdoorn* 174 (K., P., T.M.); Waterpoort, *Rogers* (T.M.).

31. **T. griseola** H. M. Forbes sp. nov., affinis *T. zoutpansbergensi* Bremekamp, sed foliis 1–2-jugatis, foliolis supra pallido-viridibus, pedunculis laxe-floris differt.

Suffrutex circiter 13–23 cm. altus, canescens. *Folia* 1–2-jugata, nonnumquam unifoliata; foliola oblanceolata, mucronata, 2–4 cm. longa, 0·6–1 cm. lata, supra glabrescentia, subtus canescentia; stipulae lineares, 2–5 mm. longae. *Pedunculi* laxiflorae, 6·5–10·5 cm. longi; bracteae 3 mm. longae; pedicelli 4–5 mm. longi. *Flores* 1·5 cm. longi; dentes calycis tubo excendentes, subulato-acuminati: ovarium 1 cm. longum, pilosum; stylus 5 mm. longus, complanatus, penicillatus.

South West Africa. Cayimaeis. *Thorne* (S.A.M. 31721) Type in South African Museum Herbarium.

Suffruticose, about 13–23 cm. high, whole plant more or less canescent. *Leaves* 1–2-jugate or sometimes simple, rhachis of pinnate leaves 1·5–2·5 cm. long, 0·9–1·5 cm. long before first pair of leaflets, petiole of simple leaves 5–6 mm. long; leaflets glabrous and pale green above, thinly canescent below, oblanceolate, mucronate, 2–4 cm. long, 0·6–1 cm. broad. *Stipules* linear, 2–5 mm. long. *Peduncles* 6·5–10·5 cm. long, laxly flowered, 1–2 flowers together at intervals of 2·5–3 cm., 1–2 flowers together in axils of upper leaves; bracts 3 mm. long; pedicels 4–5 mm. long. *Flowers* 1·5 cm. long. *Calyx* pubescent, tube 3 mm. long, lobes subulate, acuminate, 4 mm. long. *Vexillum* orbicular, 1·5 cm. long and broad. *Ovary* 1 cm. long, pilose. *Style* 5 mm. long, complanate, penicillate at apex. *Legumes*, immature, densely pubescent.

32. **T. purpurea** (L.)Pers Syn. Pl. 2.329 (1807); DC. Prod. 2.251 (1825); G. Don. Syst. Nat. 2.230 (1832); Bak. in Oliv. Fl. Trop. Afr. 2.124 (1871); Bak. in Hook. f. Fl. Brit. Ind. 2.112 (1876); Ficalho and Hiern. in Linn. Soc. Ser. 2.2.19 (1881); Mildbraed in von Micklenberg Deuts. in Afr. Exped. 1907–8 2.254 (1911); Fries in von Kosen Schwed. Rhod. Congo Exped. 1911–12 1.84 (1914); De Willd. in Bull. Soc. Bot. Belg. 57.2.124 (1925); Bothalia 3.2.239 (1937).

Syn. *Galega purpurea* Linn. Syst. Nat. 2 Editio Decimo Reformato 1172 (1759); Linn. Syst. Nat. 2 Ed. XII 497 (1767); *Cracca purpurea* Linn. Sp. Pl. Edit. 1.752 (1753). *Cracca purpurea* (L.) O. Ktz. in Hiern Cat. Afr. Pl. Welw. 1.218–225 (1896).

Type specimen, sheet No. 7, in Linnean Herbarium, Burlington House, London.

A copiously branched perennial 1–2 ft. high. *Stems* slender, firm, subglabrous. *Leaves* 7–9-jugate or 13–17-jugate, 5–9 cm. long; leaflets 1·8–2·5 cm. long, 0·5–2 cm. broad, oblanceolate, apex blunt, mucronate, sub-coriaceous, both sides grey-green, upper glabrous, lower pubescent or nearly glabrous. *Stipules* linear to linear-subulate, 4–8 mm. long. *Peduncles* terminal and leaf-opposed, 7·5–15 cm. long, laxly 6–20 flowered. *Flowers* up to 8 mm. long, pedicellate, red-purple. *Bracts* linear 2–4 mm. long. *Calyx* silky, teeth lanceo

late-acuminate, exceeding the tube in length. *Style* glabrous, penicillate at apex. *Legumes* linear, slightly recurved, glabrous or softly pubescent, 1·8–2·5 cm. long, 0·4–0·5 cm. broad, 6–10 seeded.

South West Africa.—Namakunde, *Rautanen* 511 (Pa., V., Z., B.); Olukonda, *Schinz* 563 (B.); Otavi, *Dinter* 5771 (D. Coll.); Tsumeb, *Dinter* 7466 (D. Coll.).

Transvaal. Zoutpansberg district: Zoutpansberg, *Schweickerdt* and *Verdoorn* 543 (P., T.M.); Messina, *Rogers* 20988 (Z.).

T. purpurea is a very widely distributed species occurring in all parts of the tropics. In Africa it extends throughout tropical and central Africa, South West Africa, Rhodesia and the northern Transvaal. From the material seen it appears to be a very variable plant. The specimen, "Sheet No. 7" in the Linnean Herbarium, which is said to be the type, does not agree with the early descriptions, as it appears to be a much smaller plant.

The following is an extract from Wight and Arnott Prod. Fl. Pen. Ind. Or. 1.213 (1834):—

> "The supposed type of this species has the whole plant, especially the stems and legumes, almost glabrous, but we have observed so many transitions between that state and those in which the stems might almost be called villous, and the legumes decidedly pubescent, and forms as variable as the soil in which this species is found, that we have been induced to neglect the pubescence as a character insufficient to mark a variety."

References are also made to the more or less pubescent forms and to the densely pubescent or slightly villous forms which had been cited under different species.

In India the plant is used medicinally by Indian doctors.

33. **T. Evansii** Hutch. and Burtt Davy in Fl. Tvaal. 1.2. p.p. XXXI, 378 (1932).

Type specimen *Pole-Evans* H. 16853, in Herbarium, Kew.

An erect slender branching plant. *Stems* softly pubescent with greyish hairs. *Leaves* 6–9 jugate, 4·5–10 cm. long; leaflets oblanceolate, thinly pubescent above, more densely pubescent below, mucronate, 1–3 cm. long, 4–9 mm. broad. *Stipules* linear-lanceolate, 5–6 mm. long. *Peduncles* terminal, 17–25 cm. long, more or less laxly racemosely flowered. *Flowers* 2–4 together, often in the axils of the upper leaves. *Calyx* tube 3 mm. long, 6–9 mm. in diam., lobes triangular-subulate, 3–5 mm. long. *Vexillum* 1·1 cm. long, 0·9–1 cm. broad, pubescent without. *Style* 3–4 mm. long, glabrous, penicillate at apex. *Legumes* 3–4 cm. long, 3–4 mm. broad, slightly falcate, densely and softly tomentose.

Transvaal. Barberton district: Komatipoort, *Pole-Evans* H. 16853 (K.); *Schlechter* 11763 (K., B.M., P., G., Z., V., B., B.H., A.M.); *Dyke* [Marloth Herb. 5502] (P.); Godwan River, *Rogers* 22651 (P.); White River, *Rogers* 20097 (P.); Nelspruit, *Thorncroft* 2108 (P.).

34. **T. transvaalensis** Hutch. and Burtt Davy in Fl. Tvaal. 1.2 p. XXXII and 378 (1932); Ann. Tvl. Mus. 17.4.204 (1937).

Type specimen, *Schlechter* in Herbarium, Kew.

Suffruticose. *Stems* erect, densely pilose-pubescent. *Leaves* 3–8 jugate, 4–6·5 cm. long; leaflets 2–4·5 cm. long, 3–6 mm. broad, narrow-oblong or oblanceolate, mucro short, recurved, glabrous above, softly appressedly cinereo-pilose below. *Stipules* narrow, 5–7 mm. long, 3-nerved. *Peduncles* 8–14 cm. long, terminal and leaf-opposed, laxly racemose, flowers usually in pairs. *Flowers* 7–8 mm. long; bracts 2–5 mm. long, narrow. *Calyx* tube 2 mm. long, 5 mm. in diam., lobes 2–5 mm. long, narrow triangular-subulate, pilose

without. *Style* 3–4 mm. long, glabrous, flattened, penicillate at apex. *Ovary* 4 mm. long, pubescent. *Legumes* 4 cm. long, 4 mm. broad, flat, apex slightly falcate, thinly and shortly pubescent.

Bechuanaland Protectorate.—Mochudi, *Harbor* [*Rogers* 6881] (Z.).

Transvaal.—Lydenburg district: Komatipoort, *Schlechter* 11783 (B.H., Pa., A.M.).

35. **T. inandensis** H. M. Forbes sp. nov., affinis *T. grandiflorae* (Ait.) Pers., sed stipulis subulatis differt.

Suffrutex caulibus erectis. *Caules*, pedunculi, petiolique dense pubescentes demum glabrescentes. *Folia* 6 7-jugata, 6–11 cm. longa; foliola cuneato-oblonga, retusa, mucronulata, 2·5–4 cm. longa, 1–1·5 cm. lata, supra glabra, subtus pubescentia; stipulae subulato-acuminatae, usque ad 1 cm. longae; pedunculi usque ad 7 cm. longi, terminales vel axillares; bracteae ovato-acuminatae, mox caducae; pedicelli usque ad 1 cm. longi, pubescentes. *Flores* 2 cm. longi; calyx pubescens, dentes calycis lanceolato-acuminati tubo aequilongi sed uno longiore; stylus pilosus.

Natal.—Inanda district: *Wood* 289, Inanda, Type in Natal Herbarium, Durban.

Suffruticose. *Stems* erect, with stems, peduncles and petioles densely pubescent, but becoming glabrous at length. *Leaves* petioled, 6–7-jugate, 6–11 cm. long; leaflets cuneate-oblong, retuse, mucronulate, glabrous above, pubescent below, 2·5–4 cm. long, 1–1·5 cm. broad. *Stipules* subulate, acuminate, up to 1 cm. long. *Peduncles* terminal and axillary, up to 7 cm. long. *Bracts* ovate-acuminate, soon caducous. *Flowers* 2 cm. long, "rosy", pedicels up to 1 cm. long, pubescent. *Calyx* pubescent, four lobes equalling the tube in length, lowest much longer. *Ovary* shortly and densely pubescent along margins. *Style* bearded. *Legumes* not seen.

Only one specimen of this plant is in the Natal Herbarium. It appears to be an erect shrubby plant.

36. **T. otaviensis** Dinter in Fedde Rep. 30. 204 (1932).

Type specimen, *Dinter* 5747, in Dinter's Private Herbarium.

A perennial, many-stemmed, woody, erect shrub up to 70 cm. high. *Stems* terete, thinly appressedly pubescent, branches long. *Leaves* 3–6 cm. long, petioles about 7 mm. long, 3 6-jugate; leaflets 2·5 7 cm. long, 0·5 1·2 cm. broad, oblong, shortly mucronate, midrib prominent, glabrous above and closely appressedly grey-hairy below; petiolules about 1·5 mm. long, very hairy, rotund, with a round glabrous gland on the under-surface. *Stipules* subulate, 2-nerved. *Peduncles* about 15 cm. long, angular, grooved; inflorescence rigid, laxly flowered, about 10 cm. long. *Flowers* single or two together, pale mauve; pedicels 2·5 mm. long, shortly and densely hirsute; bracts stiffly erect, awl-shaped. *Calyx* broadly campanulte, tube 9 mm. in diam., 3·5 mm. long, two upper lobes 2 mm long, three lobes 3 mm. long, all lobes 1 1·5 mm. broad, whole calyx thickly hairy with short brownish hairs. *Vexillum* hairy without, 1·8 cm. long, 1·4 cm. broad. *Ovary* 1·3 cm. long, densely silky. *Style* 4 mm. long, bearded. *Legume* linear, 13 15 seeded, 5·5–8 cm. long, 5–5·5 mm. broad, densely white hirsute.

South West Africa.—Otavi, *Dinter* 5747 (D. Coll., B., G., Pa., B.H., N., Kim.) Bei Bobos in lichten sandigen Buschvelde, *Dinter* 7570 (K., D. Coll., B.).

37. **T. lactea** Schinz in Vierteljahrsschr Nat. Ges. Zurich 52.425 (1907).

Type specimen, *Rautanen* 530, in Botanisches Museum, Zurich.

Suffruticose, branches cinereo-holosericeous. *Leaves* 7–14-jugate, 6–14 cm. long; leaflets 1·2–2·5 cm. long, 0·4 0·8 cm. broad, oblong-obovate, apex rotund or emarginate,

mucronate, base cuneate acute, glabrous above, lacto- or cinereo-holosericeous below. *Stipules* 2·5 mm. long. *Peduncles* terminal, 8–30 cm. long, many-flowered. *Flowers* pedicellate, about 1·45 cm. long. *Calyx* holosericeous, tube about 3 mm. long, lobes triangular, lanceolate, 3–5 mm. long. *Vexillum* 1·4 cm. long, silky without. *Style* bearded. *Legumes* 4–5·5 cm. long, 4–5 mm. broad, sericeous.

South West Africa.—Hereroland: Epaho, in sandigen Boden, Halbkraut, *Rautanen* 530 (Z.); *Luderitz* 1 (Z.); Namaqualand: Sendlingsgrab, Rehlboth, *Fleck* 631 *a* (Z.); Namieb bei Khoianii, *Belek* 54 *b* (Z.).

38. **T. tzaneenensis** H. M. Forbes sp. nov., affinis *T. elongatae* E. Mey., sed foliis sessilibus vel breviter petiolatis differt.

Suffrutex caulibus erectis vel ascendentibus glabris vel parce pubescentibus; foliola 1–4-juga, linearia vel oblongo-linearia, 2 9 cm. longa, 0·5–2 cm. lata, subtus glabra vel parce pubescentia; stipulae lineari-subulatae. *Pedunculus* 7·5–32 cm. longus; racemi laxiflorae. *Flores* 1·3 cm. longi; dentes calycis tubo longiores. *Fructus* 5·5–7·5 cm. longus, 0·3 cm. latus, parce pubescens.

Type specimen, *Pole-Evans* 4024, in National Herbarium, Pretoria.

Suffruticose, stems erect or ascending, glabrous or appressedly pubescent. *Leaves* 1 4-jugate, sessile or subsessile, common petiole 1·6 cm. long; leaflets linear to oblong-linear, 2–9 cm. long, 0·5–2 cm. broad, glabrous on both sides or sparsely appressedly pubescent below. *Stipules* linear-subulate, 2–6 mm. long. *Peduncles* terminal or leaf-opposed, laxly racemosely flowered, 7·5–32 cm. long; flowers 2–4-nate, 1·3 cm. long; pedicels 1 cm. long, pubescent. *Calyx* pubescent, tube 2·5 mm. long, lobes 3–5 mm. long, upper lobes connate for almost entire length; vexillum about 1·3 cm. long, 1 cm. broad. *Ovary* 4 mm. long, pubescent. *Style* 2·5 mm. long, flattened, glabrous. *Legumes* 5·5–7·5 cm. long, 0·3 cm. broad, many seeded, sparsely appressedly pubescent.

Transvaal.—Pietersburg district: Tzaneen, *Pole-Evans* 4024, (P., B.H.); *Mogg* (K.); *Rogers* 12400 (K., P., N., W., Z.); *Phillips* 3292 (P.); Haenertsberg, *Moss* and *Rogers* (K.); The Downs, Pietersburg, *Rogers* 21953 (B.M., Z., W., T.M.); Thabina, *Pole-Evans* H 15803 (K.); Duivel's Kloof, *Mogg* H 10719 (P.); Weltevreden, *Grant* (P.); Pusela, *McCallum* (P.); Shiluwane, *Junod* 632, 761, 2310 (G.); Northern Transvaal, *Le Doux* 43 (A.M.).

This species is similar in appearance to *T. elongata* but is readily distinguished by the sessile or very shortly petioled leaves.

39. **T. elongata** E. Mey. Comm. Pl. Afr. Austr. 111 (1835); Sond. in Linn. 23.30 (1850); Harv. in Harv. and Sond. Fl. Cap. 2.208 (1861–62); Wood Fl. Natal 42 (1907); Wood in Trans. S. A. Phil. Soc. 18.2.147 (1903); Ann. Tvl. Mus. 3.3.147 (1912); Bews Fl. Natal and Zululand 111 (1921); Burtt Davy Fl. Tvaal. 1.2.378 (1932).

Syn. *T. aurantiaca* R. G. N. Young in Ann. Tvl. Mus. 14.4.398 (1932).

Type specimen, *Drège* s.n., in Botanisches Museum, Berlin-Dahlem.

Suffruticose. *Stems* ascending from the base, erect, subangular, flexuous, glabrous or pubescent, up to 60 cm. long. *Leaves* 1 2-jugate, lower occasionally simple, common petiole 1·1–5·5 cm. long; leaflets linear-lanceolate, glabrous or pubescent, mucronate, 4·7 9 cm. long, 0·6 1·2 cm. broad. *Stipules* subulate-acuminate, 4–8 mm. long. *Peduncles* 6–20 cm long, laxly racemosely flowered. *Flowers* up to 1·3 cm. long; pedicels 2 4 mm. long. *Calyx*-lobes about equalling the tube in length. *Ovary* 6·5 mm. long, pubescent. *Style* glabrous. *Legumes* 5–6 cm. long, 0·3–0·4 mm. broad, pubescent or glabrescent.

Natal: in clivis circa Clydesdale, *Tyson* 2052 (K., H.B.); in graminosis clivis Clydesdale ad flumen Umzimkulu, and Umkomaas, *Drège* (B.); Durban district: on Durban Flat, *Wood* (N.); near Durban, *Wood* 5586 (G., V., P.); *Wood* 149 (B.M., G., B.); Umbilo, *Wood* (N.); Inanda district: Inanda, *Wood* 1230 (K.); Pinetown district: Pinetown, *Rogers* 2811 (Z.); Umgeni district: near Howick, *Wood* 5226 (G., Z., B.); Vryheid district: Lancaster Hill, *Burtt Davy* 11422 (P.); *Galpin* 9767 (K., P.); Vryheid, *Burtt Davy* 11472 (P.); Utrecht district: amongst rocks on granite outcrops, Paulpietersburg, *Galpin* 10884 (K., P.). No definite locality, *Gerrard* and *McKen* (Pa., V., N.).

Transvaal. Heidelberg district: *Leendertz* [T.M. 7733] (T.M.); Lichtenburg district: Grasfontein, *Sutton* 399 (P.); Potchefstroom district: Potchefstroom, *Jenkins* (T.M.); Welverdiend, *Moss* 20191 (W.); Krugersdorp district: Klip River, Krugersdorp, *Fry* 3 (P.); Johannesburg district: Kopje, Park View, Johannesburg, *Moss* 8887 (W.); *Leendertz* 6056 (T.M.); Jeppes Ridge, *Gilfillan* 26 and 52 A (P.); Milner Park, *Moss* 10583 (B.M., W.); *Moss* 14012 (W.) [Type of *T. aurantiaca* R. G. N. Young]; dry veld, Johannesburg district, *Ommanney* 81 (B.M.); Mulders Drift, *Moss* 13634 (B.M.); Witwatersrand, *Hutton* (A.M.); Modderfontein, *Haagner* (A.M.); Elsberg, *Rogers* 12138 (W.); on veld near Boksburg, *Murray* (P.); Benoni, *Bradfield* 289 (P.); Carolina district: stony slope on farm Bergendal, Carolina, *Galpin* 12499 (K., P., G., B.) Waterval Boven, *Mason* 40 (W.) and *Rogers* 14424 (Z.); Barberton district: in monte Sheba pr. Barberton, *Bolus* 7726 (B.H.); Pretoria district: S. slopes Meintjies Kop, Pretoria, *Mogg* 16522 (P.); Bryntirion, *Smith* 3347 (K., P.); dry lands, Groenkloof, *Phillips* 3059 (P.); Vaal rivier und Magaliesberg, *Zeyher* 335 and 457 (K., B.M., Pa., A.M., S.A.M.); Magaliesberg, *Burke* (K., Z., Pa.); Premier Mine, *Rogers* 15653 (B.H.); Marico district: on hillside, Marico, *Oberholzer* S. 34 (B.); Rustenburg district: Rustenburg, *Leendertz* 3471 (T.M.); Lydenburg district: Burtplaatz bei Lydenburg, *Wilms* (G.); Farm Zwagershoek, *Obermeyer* 197 (T.M.); Spekboom River, 4 miles N. of Lydenburg, *Young* A 459 (T.M.); bei der Stadt, Lydenburg, *Wilms* 401 (B.M., Pa., G., V., Z., B.); Pietersburg district: Kratzenstein, Woodbush, Pietersburg, *Hoffman* 62 (T.M.); in montibus saxosis Houtbosch, *Bolus* 11070 (H.B.); Houtbosch, *Rehmann* 6233 (K.); Shiluwane, *Junod* 1404 (G.); no definite locality, Vaal River, *Burke* 335 (Pa.); Spitzkop Goldmines, *Wilms* 402 (B.M., G., Z.); *Barber* 659 (A.M.); *Zeyher* (B.); *Drège* 456 (V.).

Var. **pubescens** E. Mey. Leaflets, stems and legumes pubescent.

Natal.—Port Natal: *Peddie* (K.); Durban district: *Rogers* 1496 (W.); Umgeni, *Thode* A. 3117 (S.); Inanda district: Kearsney, *Milner* (N.); Inanda, *Wood* 351 (K., B.M., S.A.M.); Pinetown district: New Germany, *Thode* (S.); Warrock, *Thode* (S.); pr. Krantzkloof, *Schlechter* 3214 (Z., B., G, B.); no definite locality, *Gerrard* 1110 (K., B.M., Pa., V.).

Swaziland.—Grassy hills near Dalriach, *Bolus* 11817 (P., B.H., A.M.); Hlatikulu, *Stewart* (T.M.).

Transvaal. Krugersdorp district: Witpoortjie Kloof, *Moss* 7472 (W.); Johannesburg district: Turffontein, *Weeks* (W.); Pretoria district: S. slope of Meintjies Kop, Pretoria, *Smith* 3290 (P.); slope of Meintjies Kop on N.E. side, *Smith* 759 (P.); Doornkloof, *Pole Evans* 1031 (P.); Fountains Valley, *Repton* 255 (P.); Baviaanspoort, *Smith* 1060 (P.); Wonderboompoort, *Smith* 1740 (P.); Kopje, Pretoria, *Moss* 10514 (W.); colles supra Aapies River, Pretoria, *Rehmann* 4394 (K., B.M., Z.); Koedoespoort, *Mogg* (P.); Premier Mine, *Rogers* 25054 (Z.) and 18944 (W.); Boekenhouts Valley, *Jenkins* (T.M.); Lydenburg district: Godwan River Stn., *Davison* and *Hofmeyer* 107 (P.); Barberton district: Eastern slopes, Saddleback Mtn., *Galpin* 1146 (K., P., A.M.); White River, Barberton, *Rogers* 23491 (Z.); Nelspruit, *Breyer* (T.M.); at Schagen, Nelspruit, *Liebenberg* 3300 and 3300A (P.); on top of Mt. Schagen, *Liebenberg* 2473 (P.); no definite locality, Rocker Sanatorium, *Junod* 908 (G.); Transvaal. S.A. Botanical Tour, *Hutchinson* 2335 and 2559 (K.).

In " Annals of the Transvaal Museum ", 14.4.398 (1932), Mr. R. G. N. Young described a new species, *T. aurantiaca*. I have examined his material and can find no grounds for removing it from *T. elongata*. The colour of the flowers, which he gives as a " deep orange-brown ", is not a reliable character on which to separate it, as in *T. elongata* the colour of the flowers, according to collectors' notes, varies from vermillion-red to deep orange-red.

Should further collections prove Mr. Young's plant to be worthy of specific rank, another specific name will have to be given it, the name " *aurantiaca* " being invalid, as it has already been used by Harms for a *Tephrosia* described by him in Engl. Jahrb. XXVIII. 402.

40. **T. angustissima** Engl. Bot. Jahrb. 10.29 (1888).

Type specimen, *Marloth* 1086, in Botanisches Museum, Berlin-Dahlem.

Stems elongate, ascending, slender; stems and lower surface of leaves appressedly sericeo-pilose. *Leaves* 2-3 jugate, 2–6·5 cm. long, petiole 2–4·5 cm. long before first pair of leaflets; leaflets narrow linear-lanceolate, margins cartilaginous, apex acute, 2–5 cm. long, 0·2–0·3 cm. broad. *Stipules* linear-subulate, brown, 4–5 mm. long. *Peduncles* terminal, 8–20 cm. long, densely flowered above; bracts 4–6 mm. long, subulate, brown; pedicels 3–5 mm. long; flowers 1·3 cm. long. *Calyx* densely pilose, teeth deltoid, subequal in length to tube. *Style* bearded. *Legume* narrow linear, flat, apiculate, 5–6 cm. long, 3 mm. broad, many seeded.

Bechuanaland.—Pr. Kuruman, in summo montium " Ga Mhana ", *Marloth* 1086 (B., P., A.M., S.A.M., B.H.).

Engler remarks: " It is near *T. lurida*, which, however, has longer leaflets and fewer flowers."

Apparently this plant has only been collected once. Further collectings may prove that it is merely a form of *T. lurida*.

41. **T. lurida** Sond. in Linnaea 23.30 (1850); Harvey in Harv. and Sond. Fl. Cap. 2.208 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Burtt Davy and Pott in Ann. Tvl. Mus. 3 3.146 (1912); Bak. f. Leg. Trop. Afr. 1.200 (1926); Bot. Survey of S.A. Mem. 12.68 (1928); Young in Ann. Tvl. Mus. 14.4. 402 (1932); Burtt Davy Fl. Tvaal. 1.2.378 (1932); Watt and Breyer-Brandwyk Med. and Pois. Pl. S.A. 74 (1932).

Syn. *Cracca lurida* (Sond.) O. Ktz. Rev. Gen. Pl. 1.175 (1891); O. Ktz. Rev. Gen. Pl. 3.2.57 (1893).

Type specimen, *Zeyher* 456, in Herbarium, Kew.

Suffruticose. *Stems* erect, branches ascending from the base, angular, hispid. *Leaves* 1–4-jugate, very rarely simple leaves present, up to 13 cm. long, length of petiole before first pair of leaflets 1·7·5 cm. long; leaflets elongate-linear, mucronate, glabrous above, appressedly pubescent below, midrib prominent, lutescent, 2–12 cm. long, 1–9 mm. broad. *Stipules* setaceo-subulate, 0·8–1·3 cm. long. *Peduncles* up to 30 cm. long, few flowered towards the apex. *Flowers* 1·5 cm. long. *Calyx* sericeous without, lobes acuminate, longer than the tube. *Vexillum* sericeous without. *Style* flattened, bearded. *Legume* linear, compressed, lurido-tomentose, many seeded, 7–8 cm. long.

Transvaal.—Potchefstroom district: Potchefstroom, *Goossens* 1460 (B.); Ventersdorp, *Sutton* 576 (Pa.); Marico district: Zeerust, *Leendertz* (T.M.); *Jenkins* (S.A.M.); *Thode* A 1393 (P., N.); Lichtenburg district: Lichtenburg, *Jenkins* (T.M.); Grasfontein, *Sutton* 299 (P.); Klipveld, *Liebenberg* 79 (P.); Heidelberg district: Heidelberg, *Thode* A 1308 (P.); *Leendertz* 2455 (T.M.); Witwatersrand district: Natal Spruit, Johannesburg, *Bryant* D 81 (P.); Observatory Ridge, *Burtt Davy* 18896 (K.); Jeppestown, *Galpin* 1379

(K., A.M.); Jeppes Ridge, *Galpin* 1499 (P., A.M.); Kopjes, Houghton Ridge, *Moss* 2274 and 2741 (W.); Kopjes, *Omanney* 24 and 28 (B.M.); open veld, Johannesburg, *Rand* 843 (B.M.); Witwatersrand, *Hutton* 887 (Z.); Benoni, *Bradfield* 269 (P.); Krugersdorp district: Witpoortjie, *Moss* 8361 (W.); Krugersdorp, *Jenkins* (T.M.); Pretoria district: Irene, *Rogers* 23806 (Z.); Aapies River pr. Pretoria, *Bolus* 10833 (K., A.M., G.B.); Fountains Valley, *Repton* 127 (P.); N.E. slopes of Curtis Hill, *Pole-Evans* 110 (K.); Sunnyside, *Goossens* 107 (P.); Waterkloof, *Verdoorn* 31 (P.); Arcadia, *Burtt Davy* 2433 (P., B.H.); Meintjies Kop, *Bolus* 11818 (B.H.); along N. slopes of hill near Union Buildings, *Smith* 1295 (Z., P.); near Trichardts Poort, *Smith* 3467 (P.); Wonderboompoort, *Smith* 6190 (P.); *Rehmann* 4611 (K., Z., B., B.H.); Groenkloof, *Burtt Davy* 14631 (P.); Koedoespoort, *Obermeyer* (T.M.); Koppies, Pretoria, *Leendertz* (T.M.); Pretoria, *Pont* 793 (Z.); in saxosis Mt. Magaliesberg, Aapies R., *Schlechter* 3659 (B., A.M.); Magaliesberg, *Burke* (B.M., G., K., P.); *Zeyher* 456 (K., B.M., S.A.M.); Magaliesberg and Mooi R., *Zeyher* 182 (S.A.M.); ad Mooi R., Magaliesberg, Premier Mine, *Rogers* 19832 (Pa.); *Rogers* 14726 (N.A.M.); Rustenburg district: Waterkloof, *Collins* (T.M.); Rustenburg, *McClelland* (G.U.C.); *Nation* 58 (K., B.H.); *Rogers* 23577 (Z.); Vlakfontein near Rustenburg, *Liebenberg* 144 (P., G.); Waterberg district: Mosdene, Naboomspruit, *Galpin* M 87 and M 628 (P.); near Ypres Halt, *Schlechter* 11581 (B.H.); Leeuwpoort, *Rogers* 22792 (Z.); Carolina district: Waterval Boven, *Mason* 38 (K., W.); Godwan River, *Rogers* 22650 (K., Pa., T.M.); Barberton district: Pilgrims Rest, *Greenvek* (B.M.); Barberton, *Galpin* 697 (B.H., Z.); Kaap Valley, *Galpin* 759 (N., A.M., Z.); Lydenburg district: bei der Stadt, Lydenburg, *Wilms* 401 b (Pa., B.); *Wilms* 401 (K., Pa.); Pietersburg district: in graminosis pr. pagum Pietersburg, *Bolus* 11069 (B.H.); Houtbosch, *Rehmann* 6235 (K., Z.); Waterberg district: Makapansberge, Streydport, *Rehmann* 5544 (Z.).

Rhodesia.—Matopos, Bulawayo, *Rogers* 5682 (B.H., S.A.M., T.M.); Bulawayo, *Eyles* 1206 (P., S.A.M., B.); Salisbury, *Eyles* 2170 (Pa., P., S.A.M.); Mazoe, *Eyles* 265 (B.H.).

The Zulu name for this species is "iShoba-lehashi". A cold infusion of the root is mixed with an infusion of *Dianthus crenatus* and the froth is used for washing the face so as to attract the attention of the opposite sex. As a further measure, some of the liquid is also drunk.

42. **T. longipes** Meisn. Hook. Lond. Journ. Bot. 2.87 (1843); Cape Plants, Krauss and Engler, 54 (1846); Walpers Rep. Bot. Syst. 5.515 (1846); Harvey in Harv. and Sond. 2.208 (1861–62); Baker in Oliv. Fl. Trop. Afr. 2.120 (1871); Grant and Oliv. in Trans. Linn. Soc. Lond. 29.56 (1872); Ficalho and Hiern. in Trans. Linn. Soc. Bot. Ser. 2.2.19 (1881); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Wood Fl. Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Burtt Davy and Pott in Ann. Tvl. Mus. 3. 3.146 (1912); Bews Fl. Natal and Zululand 111 (1912); Baker f. in Leg. Trop. Afr. 1.199 (1926); Young in Ann. Tvl. Mus. 14.4.398 (1932); Burtt Davy Fl. Tvaal. 1.2 (1932).

Syn. *Cracca longipes* O. Kuntze Rev. Gen. Pl. 1.175 (1891).

Type specimen, *Krauss* 20, in Herbarium, Kew.

Suffruticose. *Stems* erect, branching, angular, subcanescent. *Leaves* 2–8-jugate, 5–13 cm. long, length of petiole before first pair of leaves 1–4 cm.; leaflets 1·5–11 cm. long, 2–7 mm. broad, narrow linear, usually complicate, mucronulate, glabrous above, argenteous beneath. *Stipules* setaceo-subulate, 0·4–1 cm. long. *Peduncles* terminal, up to 50 cm. long. *Flowers* about 1·7 cm. long, few in remote fascicles; pedicels and bracts 3–5 mm. long. *Calyx* fulvo-pilose without, tube 7–8 mm. in diam., 2·5 mm. long, lobes narrow, acuminate, unequal, 1–4 mm. long. *Vexillum* densely fulvo-pilose without, 1·6 cm. long, 1·2 cm. broad. *Ovary* densely silky. *Style* bearded. *Legumes* flat, linear, 3·5–7·5 cm. long, 4 mm. broad.

Natal.—Durban district: Port Natal, *Krauss* 20 (K., G., O.); *Gueinzius* 308 (K., V.); *Krauss* s.n. (V.); *Zeyher* (Z.); near Durban, *Wood* 9565 (B, S.A.M.); Umzinyati Falls, *Wood* 1202 (K., B.M., N., B.H., S.A.M.); Umlaas, *Evans* 327 (N.); Lower Tugela district: Ntondweni, *Wood* 9214 (P.); near Tugela River, *Wood* (S.A.M., G., B.); no definite locality, *Gerrard* (P.).

Portuguese East Africa.—Ad sinum Delagoa, *Forbes* 134 (K., Pa.); Delagoa Bay, *Monteiro* (K.); Lourenço Marques, *Schlechter* 11580 (K., B.M., Pa., G., V., Z., N., P., A.M., G., B.).

A note on the specimen collected by Mrs. Monteiro states: "The Kaffirs steep the leaves of this plant and rub them on the body to keep them in health when going a journey."

Var. **uncinata** Harv.

Leaflets obtuse, recurvo-mucronulate.

Type Specimen of the variety, *Zeyher* 455, in Herbarium, Kew.

Transvaal.—Carolina district: Carolina, *Moss* and *Rogers* 1075 (Z.); Potchefstroom district: Holwater, Christiana, Bloemhof, *Burtt Davy* 11239 (P.); Pretoria district: in nemorosis ad Aapies R., *Zeyher* 455 (K., B.M., Pa., G., Z., A.M., S.A.M.); Aapies and Orange Rivers, *Burke* (K.); in campis ad Magaliesberg and Vaal River, *Zeyher* 373 (S.A.M.); Magaliesberg, *Burke* (K.); colles supra Aapies R., *Rehmann* 4393 (K., B.M., Z.); Pretoria, *Leendertz* [T.M. 104] (T.M.); Meintjies Kop Range, Pretoria, *Smith* 3447 (P.); Wonderboompoort, *Smith* 6190 (K.); Barberton district: Louws Creek, *Thorncroft* 1154 (P.); Barberton, *Rogers* 29406 (Z.); Pietersburg district: Modjadjes. Pietersburg, *Rogers* 18129 (K.); Waterberg district: Kaalfontein, *Galpin* 13382 (P.); Nooitgedacht farm near Ypres Halt, *Galpin* 11518 (Pa., B.H.); Mosdene, Naboomspruit, *Galpin* M 85 (P.); Houtbosch, *Rehmann* 6234 (Z.); Zoutpansberg district: Zoutpansberg Range, *Smuts* (P.); no definite locality, *Rehmann* 4928 (Z.); *Drège* 455 (V.); *Junod* 1573 (G., Z.); *Holland* (Z.).

43. **T. mulitjuga** R. G. N. Young in Ann. Tvl. Mus. 14. 4. 402 (6th July, 1932.).

Syn. *Tephrosia Woodii* Burtt Davy Fl. Tvaal. 1.2.378 (28th July, 1932.).

Type specimens, *Moss* 7473 and *Young* 676, in Herb. Young in Witwatersrand University, Johannesburg.

Suffruticose. *Stems* ascending, 1–2 ft. high; branches slender, flexuous, sulcate, angular, sparsely patently or appressedly clothed with reddish hairs, or glabrescent. *Leaves* 2·5–5·5 cm. long, petiole long, 3–10 jugate; leaflets 0·7–2 cm. long, 1·5–4·5 mm. broad, narrow oblong-elliptic, acuminate, mucronate, glabrous above, thinly pubescent below, veining below usually dark reddish-brown. *Stipules* 2–7·5 mm. long, linear, setaceous. *Peduncles* 15–16 cm. long, usually laxly flowered. *Flowers* 7–8 mm. long, 1–3 together. *Calyx* tube 3·5–5 mm. broad, 1·5–2 mm. long, lobes 0·5–2 mm. long, deltoid acuminate. *Vexillum* 6·5–7·5 mm. long and broad, subrotund, canescent without. *Style* 2–3 mm. long, glabrous, penicillate at apex. *Legumes* 3·5 cm. long, 3 mm. broad, linear subfalcate, appressedly pubescent.

Cape.—Eastern Province, Transkei: rocky slopes, Komgha, *Flanagan* 1139 (Z., P., A.M., B.H.); Kei River, *Drège* (K.) [Type of *T. Woodii* B. Davy]; Fakus' Territory, *Sutherland* (K.); East Griqualand: ad rivos pr. "Clydesdale" ad flumen Umzimkulu, *Tyson* 2775 (K., Z., V., G., B., S.A.M.).

Natal.—Umzinto district: in lapidosis pr. fl. Umkomanzi, *Schlechter* 6689 (B., A.M.); Durban district: pr. Durban, *Wood* 7523 (B.M., B.H.); Pinetown district: Emberton, *Schlechter* 3204 (Z., A.M.); Maritzburg district: Umlaas Drift, *Wood* 1887 (K., N., A.M., B.H.); Howick, *Franks* (N., T.M.); Weenen district: "Thorns" pr. Weenen, *Wood*

4477 (K., N.); Klip River district: Pieters pr. Ladysmith, *Wood* 6671 (K., Pa., N., P., S.A.M.); no definite locality, *Gerrard* 1073 (K., B.M., Pa., V., N.); Zululand: Entumeni, *Wylie* (N.).

Orange Free State. Bloemfontein district: Bloemfontein, *Kuntze* (B., K.); Kopje facing Tempe farm, *Potts* 2936 (K., P.); no definite locality, *Cooper* 2211 (K., Z.).

Transvaal. Standerton district: Standerton, *Leendertz* 4113b (T.M.); Potchefstroom district: Potchefstroom, *Leendertz* (T.M.); Klerksdorp, *Convent* 90 (A.M.); Magaliesberg Route, *Liebenberg* 3412 (K., P.), Krugersdorp, *Jenkins* (T.M.); Witwatersrand district: Witpoortje Kloof Witwatersrand, *Moss* 10802 (W.); and *Moss* 16195 (B.M., W.); Hillsides Jeppes Town *Galpin* 1402 (K., P., A.M.); Houghton Ridge, *Moss* 7473 (W.); Johannesburg *Leendert* (T.M.) *Rand* 1146 (B.M.), *Ommanney* 27 (B.M.); Modderfontein, *Conrath* 231 (Z.); Pretoria district: Meintjies Kop, *Mogg* 14648 (P.); *Bolus* 11820 (B.H.); S. side of Meintjies Kop, *Smith* 2307 (P.); Kopjies south of Pretoria, *Obermeyer* (T.M.); Fountains Valley, *Repton* 212 (P.); Aapies Poort, *Rehmann* 4169 (Z.); near Pretoria, *Moss* 13255 (W.); Curtis and Bournes Hill, *Pole-Evans* 97 (K.); Crocodile River, *Leendertz* 723 (T.M., B.H.); Wonderboompoort, *Smith* 1739 (P.); Hartebeestepoort, *Gillett* 1075 (P.); Carolina district: Waterval Boven, *Mason* 34 and 34 a (K.); Carolina, *Rogers* 19117 (K., Z.); Barberton district: Nelspruit, *Breyer* (T.M.); *van Elden* 12 (P.); *Rogers* 21001 (P.); Barberton, *Thorncroft* (T.M.); Komati Poort, *Schlechter* 11804 (B., P., A.M., B.H.); *Moss* and *Rogers* 620 (K., Pa.); *Rogers* 20814 (K., G., Z.); Lydenburg district: bei der Stadt, Lydenburg, *Wilms* 363 (K., B.M., Pa., G., B., V.); *Wilms* 363b (G.); Waterberg district: Houthoseh, *Rehmann* 6236 (K., B.M.); Burtplaats bei Krugerspark, *Wilms* 363 a (K., B.M.); Blue Kranz River, 1895, *Schlechter* 6864 (B., P., A.M., B.H.).

South Africa. No definite locality, *Junod* 162 (P.); *Schlechter* 3240 (Z.); *Krook* [Herb. Pouther 2544] (V.); *Thode* (B.).

44 **T. semiglabra** Sond. in Linnaea 23:29 (1850); Harvey in Harv. and Sond. Fl. Cap. 2:205 (1861–62); O. Kuntze Rev. Gen. Pl. 1:175 (1891); Burtt Davy and Pott in Ann. Tvl. Mus. 3:3:146 (1912); Ann. Bolus Herb. 3:1:20 (1920); Bot. Survey S.A. Mem. 12:68 (1928); Young in Ann. Tvl. Mus. 14: 4: 404 (1932); Burtt Davy Fl. Tvaal. 1:2:378 (1932); Watt and Breyer-Brandwyk in Med. and Pois. Pl. S.A. 74 (1932)

Syn. *Cracca semiglabra* O. Kuntze Rev. Gen. Pl. 1:175 (1891).

Type specimen, *Zeyher* 459, in Herbarium, British Museum (Natural History), London.

Stems decumbent, arising from the base, up to 3 feet long, flexuous, clothed with rufous tomentum, angular. *Leaves* 3–6-jugate, 1·5–6 cm. long, shortly petiolate; leaflets oblong-lanceolate, recurved mucronate, glabrous above, rufo-tomentose below, 1–2·5 cm. long, 0·5–1 cm. broad. *Stipules* subulate acuminate, 4–6 mm. long. *Peduncles* 7·15–20 cm. long. *Flowers* 0·9–2·3 cm. long, pedicels 0·4–1·2 cm. long. *Calyx* rufo-tomentose, tube 0·6–1·2 cm. diam., 2·5–4 mm. long, lobes lanceolate-acuminate, unequal, 1–3 mm. long. *Vexillum* 0·9–2·3 cm. long and broad, pubescent without. *Ovary* pubescent, 5–6 mm. long. *Style* glabrous. *Legumes* shortly pubescent, 3·5–4·5 cm. long, 3–4 mm. broad.

Bechuanaland Protectorate. Mochudi, *Hardie* [*Rogers* 6900] (B.H., S.); Kuruman district: *du Toit* (G.U.C.).

Cape Province. East Griqualand: in graminosis clivis Clydesdale prope flumen Umzimkulu, *Tyson* 2783 (K., B., S.A.M., P., S.).

Natal. Pinetown district: Drummond, *Francis* (N.); Maritzburg district: near Maritzburg, *Wood* 3162 (K.); Newcastle, *Wood* 7191 (K., P., N.).

Basutoland. Leribe, *Dieterlen* 129 (K., Pa., N., P., S.A.M., A.M., Z.).

Orange Free State.—Kroonstad district: *Pont* 328 (Z., P., G.U.C.); Viljoen's Drift, *Rogers* 4806 (B.M.); *Rogers* (T.M.); Bethlehem district: Dunelm Farm, Fouriesburg, *Potts* (K.); on slopes of hill near Little Caledon river, "Wyndford", Fouriesburg, *Gemmell* (G.U.C.); no definite locality, *Cooper* 2226 (K., Z.).

Transvaal.—Vereeniging district: Vereeniging, *Bruyn* 163 (P.); Witwatersrand district: Jeppestown Ridge, Johannesburg, *Gilfillan* [Herb. Galpin 6100] (P., A.M.); *Holden* (T.M.); *Moss* 61715 bis (W.); grass veld, Milner Park, *Moss* 6250 (B.M., W.), Mulder's Drift, *Moss* 13596 (W.); Klipriviersberg Range, *Rand* 1116 (B.M.); Observatory, *Weeks* 357 (W.); Modderfontein, *Conrath* 230 (Z., B.); on veld near Geduld Dam, Witwatersrand, *Murray* (P.); grass veld, Rietfontein, *Moss* 16128 (W.); Kaalfontein, *Pole Evans* H 13531 (K.); Pretoria district: in collibus lapidosis Aapies River pr. Pretoria, *Bolus* 10834 (K., B.H.); Irene near Pretoria, *Obermeyer* (T.M.); in grass near the Fountains Stn., Fountains Valley, *Repton* 195 (P.); Pretoria, *Smith* 1588 (P.); Commonage, Arcadia, *Smith* 1772 (P.); Riviera, *Smith* 1800 (Z., P.); Meintjies Kop, *Smith* 2305 (P.), in lapidosis ad ped. mont. Magaliesberg, *Zeyher* 459 (B.M., O., S.A.M.); Silverton, *Leendert* 56.5 (T.M.); Hatherley, *Collins* (T.M.); Middelburg district: near Witbank, *Gilfillan* (P., A.M.); Carolina district: Leeuwpoort, Carolina, *Burtt Davy* 7436 (P.); Farm Nootgedacht, Ermelo, *Henrici* 1383 (P.); Dasal, Ermelo, *Hoffe* 9 (P.); Barberton district: Bushveld, Warmbath, *Moss* 16584 (W.); Waterval Boven, *Mason* 34 (K.); Waterval Onder, *Jenkins* (T.M.); Saddleback Mtn., Barberton, *Galpin* 678 (Z., A.M., B.H., N., P.); Nelspruit, *Liebenberg* 2714 (P.); ridge to Pretorius Kop from White River, Lydenburg district; *Gillett* 1049 (P.); Farm Zwagershoek, Lydenburg district, *Obermeyer* 193 (T.M.); bei der Stadt, Lydenburg, *Wilms* 362 (B.M., G., V., B., T.M., B.H.); Mbabane, Swaziland, *Rogers* 11411*a* (B.H.).

Portuguese East Africa.—In solo arenoso in colle pone Lourenço Marques, *Bolus* 7725 (B.H.).

South Africa,—No definite locality 1843, *Burke* (B.M., O.); in turfosis pr. Black kopjes, *Schlechter* 4177 (K., B.M., Pa., V., G., B., B.H.,A. M., T.M.).

The Suto name for *T. semiglabra* is "Pelo-di-marobaya-thaba". A decoction of the roots of this plant together with the roots of *Haplocarpha scaposa* is used in the treatment of chest colds.

45. **T. Burchellii** Burtt Davy in Kew Bull. 50 (1921); Burtt Davy Fl. Tvaal. 1 2.378 (1932).

Type specimen, *Burchell* 1932, in Herbarium, Kew.

Slender prostrate herb. *Stems* annual, arising from a perennial root-stock, 20–30 cm. long, flexuous, branching from the base. *Leaves* shortly petiolate, 5–8 jugate, 4·4–5 cm. long, rhachis hirsute with long hairs; leaflets 0·8–1·4 cm. long, 4–8 mm. broad, obovate, retuse, mucronulate, glaucous, ciliate, glabrous above, lower surface sparsely hirsute, chiefly along the veins. *Stipules* linear, 3–5 mm. long. *Peduncles* axillary, slender, 5–12·5 cm. long, laxly flowered. *Flowers* about 6 mm. long, 2–3 together. *Calyx* hirsute with long white hairs, tube about 1–1·5 mm. long, lobes narrow subulate, about 3 mm. long. *Vexillum* pubescent on the back. *Style* glabrous. *Legumes* 3–4 cm. long, 3–3·5 mm. broad, slightly falcate, appressedly puberulous.

South West Africa.—Ondonga, Amboland, *Rautanen* 644 (K., Z., V., G.); Okahandja, *Dinter* s.n. (D. Coll.); Farm Quickborn, Okahandja, *Bradfield* 60 (T.M.); *Dinter* 119 (B.); Omaheke, *Dinter* 25636 (B.); Leutneim, *Dinter* s.n. (B.); in river bed between Hoffnungsfelde and Hans, *Pearson* 9528 (K.).

Bechuanaland Protectorate. Goruah, East Bamangwato Territory, *Holub* (K.), Batlapin Territory, *Holub* (K.); Mochudi, *Rogers* 6070 (K.); *Harbor* | *Rogers* 6590 | (Z., P.); *Harbor* 985 (Kim.); *Harbor* s.n. (T.M.); *Harbor* | *Rogers* 6501 | (P.); *Harbor* | *Rogers* 6500 | (B.H.); *Harbor* [*Rogers* 6878] (P.).

Cape Province.—British Bechuanaland: Vryburg district: Armoeds Vlakte, *Mogg* 8686 (P.); *Sharpe* (P.): Sheppards Gift, *Burtt Davy* 13749 and 13771 (P.); Experimental Farm, Vryburg, *Going* 7199 (P.): Takoon, *Burtt Davy* 13965 (P.); Litaken, *Burtt Davy* 13915 (P.); Griqualand West: Barkly West district: Daniels Kuil, *Wilman* (B.H.); Hardeveld, Priel, *Acocks* 1578 (Kim.); Hay district: Wildealsput, *Auchamp* 982 (Kim.); Griquatown, *Burchell* (K., Pa.): Bermolli, *Wilman* (K.): Kimberley district: Kimberley, *Marloth* 802 (P.); Karreeboom, Kimberley, *Wilman* 1366 (K., B.H., A.M., T.M.): in loose red sand, Karreeboom, *Wilman* 1366 bis (K., P., A.M., S.A.M., B.H.): Bushman's Fountain, *Wilman* (B.H.); Magersfontein, *Wilman* (T.M.); Reit Pan, *Reinhardt* 980 (Kim.) and *Wilman* (P.); Newlands, *Wilman* 3063 (Kim.); Herbert district: St. Clair, Douglas, *Orpen* 132 A (K.) and *Orpen* 133 (S.A.M.): Prieska district: Niekerk's Hoop, *Wilman* (P., K., T.M., A.M., B.H.); Krantzkop near Niekerk's Hoop, *Bryant* 1138 (P.).

Orange Free State.—Boshof district: Karree Pan, *Wilman* 3327 (Kim.); Smitskraal, *Burtt Davy* 10161, 11283, 11322, 11360, 12905 (P.).

Transvaal.—Bloemhof district: Christiana, *Burtt Davy* 11378, 12818, 14487 (P.); Wolmaransstad district: Wolmaransstad, *Rogers* 18470 (K.); Lichtenburg district: grass veld, Coligny, *Blenkiron* (W.): Potchefstroom district: Vereeniging, *Leendertz* 3747 (T.M.); Pretoria district: Hebron, *Dehnke* (T.M.): foot of south slope, Meintjies Kop, *Smith* 2312 (P.): Barberton district: Komatipoort, *Moss* and *Rogers* 618 (K., P.): Rustenburg district: Rustenburg, *Nation* 164 (K.) and *Nation* 246 (K.): Pietersburg district: in plantibus graminosis prope pagum Pietersburg, *Bolus* 11073 (B.H.): Mosdene, Naboomspruit, *Galpin* M 83 (P.): Klippan, Bushveld, *Rehmann* 5191 (K., B.M.): Zoutpansberg district: Valdezia, *Obermeyer* 1155 (T.M.).

Portuguese East Africa.—Lourenco Marques, *Moss* and *Rogers* 742 (K., Z., W.).

46. **T. retusa** Burtt Davy Fl. Tvaal. 1.2. pp. XXI, 378 (1932).

Type specimen, *Bolus* 7724, in Herbarium, Kew.

Stems flexuous, procumbent, erect or ascending, branching from the base and above, glabrous or slightly pubescent, dark brown. *Leaves* subsessile or very shortly petiolate, 3·5–7 cm. long, 3–7-jugate; leaflets 0·8–2 cm. long, 3·5–7 mm. broad, oblong-oblanceolate, apices very much retuse, mucronulate, glabrous above, glabrescent or very sparsely pubescent below. *Stipules* subulate, 4–6 mm. long. *Peduncles* terminal or leaf-opposed, laxly flowered, 3·5–15 cm. long. *Flower* 1·7 cm. long, pedicels 3–5 mm. long; bracts lanceolate, narrow, about equalling the pedicels. *Calyx* thinly and shortly pubescent, tube 7 mm. in diam., 3 mm. long, lobes triangular-subulate, two upper lobes connate, very short, others 2–3 mm. long. *Vexillum* thinly pubescent on back, 1·7 cm. long, 1·8 cm. broad. *Ovary* thinly pubescent. *Style* bearded. *Legumes* linear, very thinly and shortly pubescent, light brownish-yellow, 4·5–5 cm. long, 4–5 mm. broad.

Transvaal. Middelburg district: Middelburg, *Rogers* 24827 (K., G., Z., P.): Barberton district: juxta Kaap River prope Barberton, *Bolus* 7724 (K., B.H.); Kopje, Kaap Valley, Barberton, *Galpin* 1180 (K., P., N., S.A.M., A.M.); Barberton, *Pott* 5326 (T.M.); Lydenburg district: Schagen, Nelspruit, *Liebenberg* 3317 (K., Pa., P.); Pietersburg district: in clivibus Mt. Elandspruitbergen, *Schlechter* 3837 (B.H.): Shiluwane, *Junod* 1125 (K., Z.).

Swaziland.—In graminosis in terra "Middel Veld" dicta pr. pagum Bremersdorp, *Bolus* 11821 (K., B., B.H.).

47. **T. capensis** (Jacq.) Pers. Syn. 2.330 (1807); DC. Prodr. 2.252 (1825); Spreng. Syst. Veg.3.233 (1826); Linnaea 7.168 (1832); E.Mey. Comm. Pl. Afr. Aust. 1.1.110 (1836); Ecklon and Zeyher Enum. Pl. Afr. Aust. Pt. 2 (1836); Hook. Lond. Journ. Bot. 2.88 (1843); Cape Plants, Krauss and Engler (1846); Harvey in Harv. and Sond.

Fl. Cap. 2.207 (1861–62); Bolus and Wolley Dod in Trans. S.A. Phil. Soc. 14.3.237 (1903); Zahlbr. Ann. K. K. Naturhist. Hofmus. 20.3.24 (1905); Wood Fl. Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Burtt Davy and Pott in Ann. Tvl. Mus.3.3.146 (1912); Die Veg. der Erde 9.3.590 (1915); Phillips in Ann. S.A. Mus. 16.1.82 (1917); Bot. Survey S.A. Mem. 1.64 (1919); Bews Fl. Natal and Zululand 110 (1921); Bot. Survey S.A. Mem. 12.68 (1928); Bot. Survey S.A. Mem. 13.35.38 (1929); Levyns Guide to Flora of Cape Peninsula (1929); Burtt Davy Fl. Tvaal. 1.2.378 (1912); Watt and Breyer-Brandwyk Med. and Pois. Pl. S.A. 74 (1932); Bothalia 3.2.239 (1937).

Syn. *Tephrosia capensis* (Jacq.) Pers. var. a. *Jacquini* Harv. in Fl. Cap. 2.207 (1861–62); E. Mey. Comm. Pl. Afr. Aust. 1.1.110 (1836); *Tephrosia capensis* (Thbg.) Pers. in O. Kuntze Rev. Gen. Pl. 1.174 (1891); *Tephrosia ternatifolia* R. G. N. Young, in Ann. Tvl. Mus. 14.4.406 (1932); *Galega capensis* Jacq. Coll. 2.292 (1788); Jacq. Ic. Pl. Rar. 3.14 t. 574 (1786–93); Linn. Syst. Nat. ed. 13 per Gmelin 2.11.1130 (1792); Thunb. Prodr. 134 (1800); Willd. Sp. Pl. 3.11.1250 (1803); Linn. Syst. Nat. 6.1216 (London 1806); *Cracca capensis* (Thbg.) O. Ktze. Rev. Gen. Pl. 3.2.57 (1893).

Suffruticose. *Stems* procumbent, several from a woody root-stock, pubescence variable, branches slender. *Leaves* long petiolate, 2–4-jugate, 1–3 cm. long: leaflets sub-cuneate oblong or lanceolate, obtuse or acute, glabrescent above, glabrous or hirsute below, veining usually dark reddish-brown on lower surface, 1–3 cm. long, 0·5–1·4 cm. broad. *Stipules* subulate, 3–5 mm. long. *Peduncles* opposite leaves, slender, 7–15 cm. long, interruptedly few-flowered. *Flower* 0·65–1 cm. long; pedicels 3–5 mm. long. *Calyx*-teeth equalling or longer than the tube. *Ovary* 4–5 mm. long, silky. *Style* glabrous, *Legume* linear, narrow, 3·5 cm. long, 0·3 cm. broad, pubescent, thinly puberulous or glabrescent, about 8-seeded.

Cape.—Capetown district: Cape Town, *Prior* (K.); *Alexander* 109 (K.); *Rogers* 17800 (G.); Camps Bay, *Prior* (K.); *Young* (T.M.); Hillside above Bantry Bay, Sea Point, *Smith* 2938 (P.); W. slopes, Lions Head, *Levyns* (S.A.C.); steinige stellen am westlichen Abhang des Kasteel Berg, *Zeyher* 4824 (B;H.S.); Kasteels Poort, Table Mtn., *Thorne* (S.A.M.); in fruticetis inter lapides alt. 2 mont. tab., *Ecklon* 817 (K.); Contour Path, N. slopes of Table Mtn., *Moss* 7803 (W.); Devils Peak, *Wolley Dod* 16 (B.H.) and 585 (K.); in Monte Diaboli, *Rehmann* 1096 (B.M., Z.); and 1097 (Z.); W. slopes of Apostles, *Pillans* 3472 (P.); in ericetis, Rondesbosch, *Zeyher* (S.A.M.); Kirstenbosch, *Adamson* (S.A.M.); Wynberg Hill, *Guthrie* 256 (S.A.C.); slopes behind Wynberg Park, *Kensit* (B.H., T.M.); Wynberg Hill, *Bolus* 3895 (B.H., A.M.); Simonstown, *Salter* (B.M.); Simons Bay, *Wright* (Pa.); Caledon district: Hermanus, *Rogers* 2644 (T.M.); *Galpin* 12902 (P.); *Gillett* 644 (B.H.); Swellendam district: on plains of George and Swellendam, *Bowie* 4 (B.M.); Riversdale district: Riversdale, *Schlechter* 1863 (1) (W.); *Levyns* 3155 (S.A.C.); *Rust* 217 and 305 (B.); Mossel Bay district: Mossel Bay, *Moran* (Kim., T.M.); George district: George, *Moss* 6099 (W.); Knysna district: Knysna, *Keet* 678 (P.); *Rosenbrock* 1159 (B.); Humansdorp district: The Glen, Humansdorp, *Burtt Davy* (P.); Kouja R., near drift on road from Zuur Anys, *Fourcade* 3092 (K.); Uitenhage district: on fields by Zwartkop R. and on hills of Adow, *Zeyher* 59 (K., B.H., A.M.); Uitenhage, *Penther* 2462 (V., B.); *Zeyher* 282 (Pa., G., B.); *Prior* (K.); *Thode* A 641 (P.); Zuurberg Sanatorium, *Long* 262 (K., P.) Enon near Zuurberg, *Thode* A 2638 (P., N.); Aloes, *Drege* 3068 (P., A.M.); Port Elizabeth district: near Port Elizabeth, *Baur* (K); Emerald Hill, *Paterson* 2342 (P., B.H., A.M.) Somerset East district: common along Sky Parlour Level, *Scott Eliot* 498 (B.); Graaff Reinet district: summit of Cave Mtn. near Graaff Reinet, *Bolus* 247 (K., B.H.); Queenstown district: Fincham's Nek. Queenstown, *Young* (W.); Plains, Queenstown, *Galpin* 1679 (B., P.); Cathcart district: Cathcart, *Kuntze* (K.); Albany district: Fish River Heights, *Hutton* (P.); Bathurst district: road to Three Sisters, *Britten* 718 (A.M.); East London district: East London, *Ottley* 2523 (W.); Nahoon R. Valley, *Smith* 3763 (P.); Buffalo River, *Rogers* (T.M.); Komgha district: grassy hills, Komgha, *Flanagan* 132 (A.M., P., S.A.M.); British Kaffraria, *Cooper* 540 (B.M., Z., V.); Franklin district: near Newmarket, *Krook* (B.).

Natal.—Port Natal, *Gueinzius* 332 (V.); *Gueinzius* 625 (V.); *Gueinzius* 312 (Pa., V.); Mayville, *Wood* (N.); Inanda district: Umhlanga, *Wood* 572 (B.M.); Umhlanga, *Wood* 1000 (N.); Pinetown district: New Germany, *Indian Collector* (N.); Dundee district: The Dam, Talana, Dundee, *Truscott* 58 (P.); Vryheid district: Vryheid, *Pole-Evans* 3896 (P.); Weenen district: among rocks, South Downs, Weenen Cty, *Evans* 478 (N.); Newcastle district: Boscobello, *Jenkins* (T.M.); no definite locality, *Wood* 779 (K., B.H.). Zululand, *Gerrard* and *McKen* (B.M., Pa.).

Basutoland.—Plateau slopes, Leribe, *Dieterlen* 333 (P., N., S.A.M., Pa.); on slopes of mtn., S. Basutoland, *Castignani* (G.U.C.).

Orange Free State.—Harrismith district: Harrismith, *Sankey* 55 (K.); Bethlehem district: Fouriesburg, *Potts* 4911 (K., G.U.C.); Heilbron district: Leeuw Spruit and Vredefort, *Barrett-Hamilton* (B.M.); Bloemfontein district: E. side of Grants Hill, Bloemfontein, *Potts* (K., P., G.U.C.); Top of Grants Hill, Bloemfontein, *Potts* 2364 (P.).

Transvaal. Standerton district: Standerton, *Leendertz* 4113a (T.M.); Heidelberg district: Bolton Wold, Vereeniging, *Burtt Davy* 15083 (P.); grass veld, Doorntree Kloof, *Moss* 14249 (W.); Benoni *Bradfield*. 127 (P.); Middelburg district: Pan, Middelburg, *Burtt Davy* 13236 and 13237 (P.); Pretoria district: in graminosis pr. Aapies River, *Schlechter* 3665 (B., T.M., B.H.); Skinners Court, Pretoria, *Burtt Davy* (P.); Meintjies Kop, Pretoria, *Smith* 1417 (Z., P.); Wonderboompoort, *Rehmann* 4593 (B.M., Z.); Barberton district: Komatipoort, *Moss* and *Rogers* 619 (Z.); Marico district: Sandy Hill, Marico, *Oberholzer* s. 32 (B.); Waterberg district: Potgietersrust, *Crawley* (P., T.M.); road between Pietersburg and Louis Trichardt, *Pole-Evans* and *Van Nouhuys* 1941 (P.); Zoutpansberg, *Junod* 4372 (P., T.M.); on lower slopes of Zoutpansberg, *Schweickerdt* and *Verdoorn* 531 (P.). No definite locality, Vaal River, *Zeyher* (B., S.A.M.); Bushveld inter Elands R. and Klippan, *Rehmann* 5046 (Z.); *Ecklon* and *Zeyher* 2398 (V.).

South Africa.—No definite locality: *Burchell* 92 (G.); *Burchell* 6146 (Pa.); *Krauss* (V.); *Krebs* (G., B.); *Bayer* (B.); *Rehmann* 1098 (Z.); *Harvey* 733 (K.); *Engler* 47 (B.); *Bergius* (B.); *Lehmann* (Pa.); *Lichtenstein* 50 (B.); *Moricand* (G.); *Mund* and *Maire* (V., B.); *Mund* (K.); *Ecklon* and *Zeyher* 1629 (V.); *Vaillaur* (Pa.).

Var. *a* **hirsuta** Harv. Leaflets more or less densely pubescent or hirsute below; oblong, obtuse or acute.

Cape.—Riversdale district: Zandhoogte, *Muir* 86 (P.); in graminosis pr. Riversdale, *Schlechter* 1863 (B.M., G., Pa., Z., B., P., A.M.); George district: pone Georgetown, *Zeyher* (S.A.M.); George, *Moss* 6095 (W.); *Rogers* 26469 (K.); *Wilman* 823 (S.A.M.); in montibus Long Kloof, Montagu Pass, *Fr. de Castelnau* 97 (Pa.); Outeniqua Mtns., Montagu Pass, *Rehmann* 12 and 13 (Z.); Knysna district: Poort Hills, *Fourcade* 589 (Z., A.M.); Knysna, *Schonland* 3474 (A.M., Pa.); *Breyer* (T.M.); Karatora Village, *Keet* 1149 (A.M.); Voetzie, Knysna, *Keet* 678 (A.M.); on hillsides, E. Head, Knysna, *Williamson* 106 (A.M.); Hackerville–Knysna, *Breyer* (T.M.); Plettenberg Bay, *Zeyher* (S.A.M.); *Rogers* 27942 and 28391 (P.); *Rogers* 28392 (K.); Uniondale district: on edge of road, De Vlucht, *Keet* 593 (A.M.); along the Avontuur Line, *Britten* 1035 (P.); Humansdorp district: mixed Duine veld at Slang River, Humansdorp, *Phillips* 3418 (K., P.); Uitenhage district: Aloes, *Drège* 3157 (P.); Uitenhage, *Thode* A 641 (N., P.); near road from Uitenhage to Van Stadens, *Schonland* 3271 (P., A.M.); in lapidosis ad van Stadens Mtns., *Zeyher* 2396 (S.A.M.); Van Stadens, *Paterson* (T.M.); grassy hills, van Stadens R. near Mine Road, *Bolus* (B.H.); Port Elizabeth district: buschige Felder, Port Elizabeth, *Rosenbrock* 87 (B.); Humewood, *Holland* 3724 (B.H.); Mill Park, Port Elizabeth, *Moorshead* (W.); *Moss* 15417 (W.); Alexandria district: Zuurberg, *Paterson* 33 (A.M.); Sandflats, Hillary, *Burtt Davy* (P.); Grahamstown district: Grahamstown, *Daly* and *Cherry* 925 (T.M.); *Burtt Davy* 11543 (P.); *Burtt Davy* 12166 (P.); *Rogers* 27329 (K., Z., P.); near Grahamstown, *Gillett* 2494 (B.H.); *Zeyher* (S.A.M.); dry slopes, Gowies Kloof, Oatlands, *Rennie* 186 (S.A.C.); flats, Hofman's Bosch, *Britten* 1035 (A.M.); in lapidosis clivis, Bothas Hill, *MacOwan* 478 (K.);

Bothas Hill, *Dyer* 1426 (B., P., A.M.); Peddie Road, *Dyer* 1360 (A.M.); Albany, *Parry* (A.M.); *Britten* 718 (P.); *Gawl* (P.); Bathurst district: Port Alfred, *Potts* 221 (A.M.); Kingwilliamstown district: Kingwilliamstown, *Hilner* 110 (A.M.); Stockenstroom district: grassy ridges, Willsdale Commonage, Stockenstroom, *Scully* 228 (S.A.M.); Queenstown district: grassy plains, Queenstown, *Galpin* 1679 (A.M.); Aliwal North district: on rocky mountain sides, Elands Hoek, near Aliwal North, *Bolus* 293 (B.H.); East London district: grass plains, Shelley Beach, *Galpin* 7344 (A.M., P.); Cambridge, *Wormald* 9 (A.M.); Coldstream, *Schonland* 1521 (A.M.); Komgha district: grassy hills near Komgha, *Flanagan* 617 (P., A.M., S.A.M.); Willowvale district: River mouth, Mazeppa Point, *Hilner* 462 (P., A.M.); Umtata district: near Umtata, *Flanagan* 2854 (B.H.); Cafferland, *Gill* (K., Z.); East Griqualand: in clivis saxosis Kokstad, *Tyson* 2976 (S.A.M.); in graminosis clivis "Clydesdale" ad flumen Umzimkulu, *Tyson* 1432=2783 (Pa., V., Z., P., S.A.M., T.M.). No definite locality, "Mofube, Cape", *Jacottet* (Z.).

Basutoland.—Leribe, *Phillips* 522 (S.A.M.).

Natal.—Heavetree Farm, *Ralfe* (P.).

Orange Free State.—Bethlehem district: Witzies Hoek, *Rhode* (B.H.); Bloemfontein district: in collibus lapidosis prope Bloemfontein, *Bolus* 10802 (B.H.); Winburg district: Houtenbek near Brandfort, *Burtt Davy* 14700 and 14694 (P.); Kroonstad district: Kroonstad, *Pont* 443 (P.).

Transvaal.—Potchefstroom district: on veld preservation experiment plots, Potchefstroom, *Liebenberg* 915 (P.); Johannesburg district: Thorntree Kloof, *Moss* 6803 and 10533 (W.); Modderfontein, *Conrath* 231 A (Z., B.); Pretoria district: Pretoria, *Leendertz* 466 (B.H.); colles supra Aapies River, *Rehmann* 4399 (Z.); Barberton district: Komatipoort, *Rogers* 2266 (Z.); in graminosis pr. Crocodile River, *Schlechter* 3987 (B., B.H.); Lydenburg district: bei der Stadt, Lydenburg, *Wilms* 365 (K., B.M., P., G., Z., B.).

Var. *β.* **angustifolia** Harv. Leaflets very narrow, lanceolate, complicate, mucro recurved, slightly hirsute below.

Cape.—Swellendam district: in collibus graminosis ad Buffelsjagts River, Swellendam, *Zeyher* (S.A.M.); Mossel Bay district: Vrigers Berg, *Muir* 2046 (P.); Uniondale district: rocky hill N. of Joubertina, *Fourcade* 2935 (K.); Humansdorp district: Loerie Plantation, Humansdorp, *Dix* 119 (B.H.); Uitenhage district: in montibus ad Elandsriver, Uitenhage, *Zeyher* (S.A.M.); *Bolus* (B.H.); *Burchell* (K.); ad flumen Zwartkopsrivier, *Zeyher* (S.A.M.); in arenosis ad Zwartkopsrivier, *Zeyher* 2397 (S.A.M.) Albany district: Redhouse, *Paterson* 296 (A.M.); Grahamstown, *Rogers* 27426 (A.M.), and *Rogers* 27326 (K., P.); Penrich Farm, Botha's Ridge, *Dyer* 1165 (A.M., P.); Assegai Bosch, *Breyer* (T.M.); Graaff Reinet district: Cave Mt. near Graaff Reinet, *Bolus* 11822 (B.H.); Cradock district: in lapidosis aridis prope Mortimer in Ditione Cradock, *Kensit* (B.H.); Cathcart district: *Drège* (K.); Pondoland: Port St. Johns, *Flanagan* (P.).

Natal.—No definite locality, *Cooper* 2221 and 2222 (K.).

Var. γ. **longipetiolata** H. M. Forbes var. nov.

A typo petiolis longioribus differt.

Leaves 1–3-jugate, 3–10 cm. long, petiole before first pair of leaflets 2·5–9 cm. long; leaflets 1·9–3·5 cm. long, 4–7 cm. broad.

Cape.—Grahamstown district: Trapps Valley, *Anstey* 4 (A.M.); Bothas Hill, *MacOwan* (B.H.); East London district: East London, *Breyer* (T.M.); Kentani district: prostrate among grasses, Coast, *Pegler* 1295 (T.M., P.).

T. ternatifolia R. G. N. Young in Ann. Tvl. Mus. 14.4.406 (1932). I have examined all the material of this species cited by Young and can find no legitimate reason for separating it from *T. capensis*. The distinguishing character used by Young in his key is "terminal leaflets equalling the petiole," but this feature is not constant, as in speci-

mens written up and cited by Young, the terminal leaflets not only equalled the petioles, but exceeded them or were much shorter. These differences in length quite frequently occurred on the same specimen. The interrupted inflorescence and dark venation on the lower sides of the leaflets are both characteristic of *T. capensis*, therefore, in my opinion, the specimens cited by Young as *T. ternatifolia* should be transferred back to *T. capensis*.

The very large amount of material included in this species shows a great range of variety in general habit, and, in particular, in the length and breadth of the leaflets, and in the almost complete absence of pubescence to types which are distinctly hairy. These variations frequently so merge into each other that it is puzzling to decide definitely to which variety a specimen may belong, so that the varieties tend to become rather artificial. In a few instances, specimens, generally collected only once, do appear to differ, but until such time as more complete material has been collected from the same localities, it is, I think, advisable to retain them in this group.

To the Zulus this plant is "isiKhwali" and they use the root to make an emetic for biliousness. The Suto name is "pelo-di-maroba" and the Suto use the cooked root with a decoction of *Commelina africana* for nervousness and weak heart.

48 **T. pseudocapitata** H. M. Forbes sp. nov., affinis *T. macropodae* Harv., sed caulibus brevioribus, stipulis subulatis, dentibus calycis tubo brevioribus differt.

Caules ascendentes vel decumbentes, e basi ramosi, parce fulvo pilosi. *Folia* 2–4-jugata, 2·5–8 cm. longa; foliola obovato-cuneata, 2·5–5·5 cm. longa, 0·8–2 cm. lata, mucronata, supra glabra, subtus leviter pilosa; stipulae subulatae, usque ad 1·5 cm. longae; pedunculi usque ad 14 cm. longi. *Flores* 1·5 cm. longi; bracteae lineari-subulatae; dentes calycis triangulari-subulati, tubo breviores; ovarium pubescens; stylus pilosus.

Type specimen, *Wylie* (N.H. 21787), in Natal Herbarium, Durban.

Stems ascending or decumbent, branching from the base, thinly tawny pilose. *Leaves* 2–4 jugate, 2·5–8 cm. long; leaflets obovate-cuneate, mucronate, glabrous above, thinly pilose below, 2·5–5·5 cm. long, 0·8–2 cm. broad. *Stipules* subulate, up to 1·5 cm. long. *Peduncles* terminal, up to 14 cm. long, flowers few in a short dense raceme, almost capitate. *Flowers* purple, 1·5 cm. long; bracts linear-subulate. *Calyx*-lobes triangular-subulate, shorter than the tube. *Ovary* pubescent. *Style* bearded.

Natal. Krantzkop district: Greytown, *Wylie* [N.H. 21787] (N.); *Wylie* [N.H. 2799] (N., P.)

49 **T. natalensis** H. M. Forbes sp. nov., affinis *T. pseudocapitatae* H. M. Forbes, sed inflorescentiis laxe racemosis, dentibus calycis tubo longioribus differt.

Caules ascendentes vel decumbentes, e basi ramosi, fulvo-pilosi. *Folia* 3–5-jugata, 6·5–12 cm. longa; foliola cuneata vel obovato-cuneata, 2·4–5 cm. longa, 0·7–2 cm. lata, apice truncata vel emarginata, supra glabra, subtus leviter pilosa; stipulae subulatae, acuminatae, 1–2 cm. longae, 3–5 nervatae; pedunculi 6·5–19·5 cm. longi. *Flores* 1·3–2 cm. longi; bracteae lineari-subulatae, 7–8 mm. longae; calyx dense fulvo-pilosus, dentibus lineari-lanceolatis tubo excedentibus; ovarium fulvo-pubescens; stylus pilosus.

Type specimen, *Wood* 8341, in Natal Herbarium, Durban.

Stems ascending or procumbent, branching from the base, fulvous pilose. *Leaves* 3–5 jugate, 6·5–12 cm. long, leaflets cuneate or obovate-cuneate, truncate or emarginate, mucronulate, glabrous above, thinly pilose below, 2·4–5 cm. long, 0·7–2·2 cm. broad. *Stipules* subulate, acuminate, 1–2 cm. long, 3–5 nerved. *Peduncles* terminal, 6·5–19·5 cm.

long, flowers in a lax raceme, in fascicles of 2–4. *Flowers* 1·35–1·9 cm. long; pedicels 0·6–1 cm. long; bracts linear-subulate, 7–8 mm. long. *Calyx* densely fulvo-pilose, teeth longer than the tube, linear-lanceolate. *Ovary* fulvo-pubescent. *Style* bearded.

Natal.—Maritzburg district: Hawthorns Hill, Maritzburg, *Allsopp* 465 (N.); near Maritzburg, *Bell* (N.); Howick, *Wood* 8431 (K., N.); Harding district: Harding, *Oliver* 98 (N.).

50. **T. apiculata** H. M. Forbes sp. nov., affinis *T. natalensi* H. M. Forbes, sed foliolis distincte apiculatis, dentibus calycis tubo subaequilongis differt.

Caules decumbentes vel ascendentes, e basi ramosi, parce pubescentes. *Folia* 2–5-jugata, 1·5–4·5 cm. longa; foliola elliptico-cuneata, apiculata, 2–4 cm. longa, 0·5–1·2 cm. lata, supra glabra, subtus leviter pilosa; stipulae lineari-subulatae, acuminatae, 1–1·5 cm. longae; pedunculi terminales axillaresque, usque ad 16 cm. longi; bracteae lineares, 7–8 mm. longae. *Flores* 1·3–1·5 cm. longi; calyx dense pubescens, lobi tubo subaequilongi uno longiore; ovarium dense pubescens; stylus pilosus. *Fructus* non visus.

Type specimen, *Acocks* 11749, in Natal Herbarium, Durban.

Stems decumbent or ascending, several arising from a woody root-stock, thinly pubescent. *Leaves* 2–5-jugate, 1·5–4·5 cm. long, shortly petioled; leaflets elliptic-oblong, apiculate, thinly pilose below, glabrous above, 2–4 cm. long, 0·5–1·2 cm. broad. *Stipules* linear-subulate, acuminate, 1–1·5 cm. long. *Peduncles* terminal and axillary, up to 16 cm. long, few-flowered at apex or flowers in an interrupted raceme, 2–4 together; bracts linear, 7–8 mm. long. *Flowers* 1·3–1·5 cm. long; vexillum densely tawny-velvety without. *Calyx* densely pubescent, four lobes subequal to tube in length, lowest longer, lobes lanceolate. Vexillary stamen free; ovary densely pubescent. *Style* bearded. *Legumes* not seen.

Natal.—Utrecht district: Kaffir Drift, *Thode* A 224 and A 268 (N., P.); Paulpietersburg district: between Paulpietersburg and Sunkelsdrift, *Acocks* 11749 (N.); Paulpietersburg, *Galpin* 9707 and 10908 (K., P.).

Transvaal.—Piet Retief district: Piet Retief, *Jenkins* (T.M.); Ermelo district: Spitzkop, Ermelo, *Pott* (T.M., B.H.).

KEY TO SECTION 4.

Stems erect	A.	
Stems ascending, decumbent or trailing	B.	
A. Peduncles terminal	C.	
Peduncles terminal, axillary or leaf-opposed	D.	
C. Peduncles 2–7 cm. long, densely flowered		51. *zombensis.*
Peduncles up to 5 cm. long, few (2–4) flowered		52. *Bachmannii.*
D. Peduncles terminal and leaf-opposed	E.	
Peduncles terminal and axillary	F.	
E. Peduncles racemosely few-flowered towards apex		53. *Wyliei.*
Peduncles not racemosely flowered	G.	
G. Flowers fasciculato-corymbose at apex		54. *grandiflora.*
Flowers 2–3 together in interrupted spicate glomerules		55. *glomeruliflora.*
F. Peduncles up to 2 cm. long; calyx lobes much longer than tube		56. *subulata.*
Peduncles exceeding 2 cm.; calyx lobes subequal to tube		57. *shiluwanensis.*
B. Stems ascending or decumbent	H.	
Stems trailing or diffuse	I.	
H. Stems, etc., densely albo-pilose		58. *albissima.*
Stems, etc., not albo-pilose	J.	
J. Stipules cordate; leaves 5–6-jugate		59. *cordata.*
Stipules ovate; leaves 1–4-jugate	K.	
K. Stems erect or ascending; calyx teeth longer than tube		60. *spathacea.*
Stems decumbent or ascending; calyx teeth subequal to tube	L.	

L.	Stems bearing several leaves and peduncles ; leaves long petioled	61. *Galpinii.*
	Stems bearing one leaf and 1–2 peduncles ; leaf shortly petioled..	62. *unifolia.*
I.	Flowers subtended by minute lanceolate bracts ; leaves 5–7-jugate	63. *radicans.*
	Flowers subtended by ovate bracts ; leaves not more than 4-jugate..... M.	
M.	Leaves shortly petioled.....	64. *zuluensis.*
	Leaves long petioled..... N.	
N.	Stems more or less robust ; stipules broadly ovate, up to 1·2 cm. long.....	65. *macropoda.*
	Stems subfiliform ; stipules ovate, up to 6 mm. long.....O.	
O.	Leaves 1–2-jugate ; stamens monadelphous.....	66. *aemula.*
	Leaves 3–4-jugate ; stamens diadelphous.....	67. *diffusa.*

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51. **T. zombensis** Baker in Kew Bull. 257 (1897) ; Baker f. Leg. Trop. Afr. 1.213 (1926) ; Burtt Davy Fl. Tvaal. 1.2.377 (1932).

Type specimen, *Whyte*, in Herbarium, Kew.

A shrub, branches woody, densely clothed with white or tawny hairs. *Leaves* shortly petiolate, 5–15-jugate, 3·5–18·5 cm. long ; leaflets oblong, obtuse, mucronate, green and glabrous above, sericeous below, 1·5–4·5 cm. long, 0·6–1·5 cm. broad. *Stipules* ovate, acuminate, densely pilose on back, 2–3 mm. broad, 0·5–1 cm. long. *Peduncles* terminal, 2–7 cm. long, racemes densely flowered, subglobose. *Flowers* up to 1·8 cm. long, pedicellate ; pedicels 6–7 mm. long ; bracts lanceolate, pubescent. *Calyx* densely pilose, tube 4 mm. long, 1 cm. in diam., lobes acuminate, 0·7–1 cm. long, much longer than the tube. *Vexillum* orbicular, sericeous on the back, 1·4 cm. long, 1·5 cm. broad. *Ovary* linear, pilose, 9 mm. long. *Style* thinly bearded along inner surface. *Legumes* about 3 cm. long, 6 mm. broad, densely velvety.

Cape.—Piquetberg district : open mountain side, De Hoek, *Taylor* 646 (P.).

Transvaal.—Pietersburg district : Magoebas Kloof, Houtboschberg, *Burtt Davy* 2600 (P.) ; upper slopes of Magoebas Kloof, *Obermeyer* (T.M., N.) ; New Agatha, *Rogers* 18886 (K., Z., B.H., T.M.) ; De Hoek, *Taylor* 646 (P.).

The type specimen was collected by *Whyte* at Mt. Zomba, Nyasaland in 1896. It has also been collected in Nyasaland by Buchanan and in Southern Rhodesia by Eyles.

In general appearance *T. zombensis* Bak. is similar to *T. Vogelii* Hk. f., but there are points of difference, particularly in the long acuminate calyx lobes of the former species. *T. zombensis* is reputed to have toxic properties similar to those of *T. Vogelii*.

52. **T. Bachmannii** Harms in Engl. Bot. Jahrb. 26.286 (1899).

Type specimen, *Bachmann* 616, in Botanisches Museum, Berlin-Dahlem.

A shrub, branching freely, branches ascending, appressedly puberulous when young, becoming quite glabrous. *Leaves* 3–6-jugate, shortly petiolate, 1–4 cm. long ; leaflets linear-oblanceolate, narrowed towards the base, apex obtuse or acute, mucronulate, glabrous above, pubescent below, 1·8–4·5 cm. long, 2·5–5·5 mm. broad. *Stipules* ovate, acute, pubescent or subglabrous, 5-nerved, 4–6 mm. long, 2–3 mm. broad. *Peduncles* up to 5 cm. long, terminal, few-flowered (2–4 flowers) ; bracts ovate, sericeous, up to 5 mm. long. *Flowers* about 2 cm. long ; pedicels 4–7 mm. long, sericeous. *Calyx* densely fulvous silky, lobes not longer than the tube, upper lobe lanceolate-ovate, acute ; lateral lobes a little shorter, deltoid-ovate, acute, lower broadly 2-dentate. *Vexillum* about 2 cm. long and broad, densely fulvous silky without. *Ovary* with long fulvous hairs along the sutures. *Style* bearded. *Legumes* 2–7 cm. long, 0·8 cm. broad, fulvous along the margins.

Cape.—Pondoland : no definite locality, *Bachmann* 616 (B.).

Natal.—Port Shepstone district: near Murchison, *Wood* 3021 (N.); *Wood* 3101 (K., N.); Margate, *Rump* (N.); Oribi Flats, *Rump* (N.).

A shrub with large showy mauvy-pink flowers. It is readily distinguished from the other large flowered species by the tawny hairs on the petioles, peduncles, calyx and vexillum which are a striking contrast to the canescent pubescence of the bracts subtending the flowers and the undersurface of the leaves.

53. **T. Wyliei** H. M. Forbes sp. nov., affinis *T. grandiflorae* (Ait.) Pers., sed foliolis floribus bracteisque multo minoribus differt.

Suffrutex. Caules erecti, glabrescentes vel parce pubescentes. *Folia* 4–7-jugata, 4–7·5 cm. longa; foliola cuneata, apice retusa vel emarginata, 1·2–2 cm. longa, 0·5–1 cm. lata, mucronata, supra glabra, subtus parce appresse pubescentia; stipulae ovato-cordatae, acuminatae, 5–6 mm. longae; pedunculi usque ad 22 cm. longi; bracteae ovatae, 3–5 mm. longae, mox caducae. *Flores* 1·3–1·5 cm. longi; calyx leviter pubescens, dentibus lanceolatis tubo subaequilongis; stylus pilosus. *Fructus* linearis, 3·5–4 cm. longis, 0·7 cm. latus, glaber.

Type specimen, *Wylie* (Wood 5219), in Natal Herbarium, Durban.

Suffrutex. *Stems* erect, branching, glabrescent, or very slightly pubescent, dark reddish-brown. *Leaves* 4–7-jugate, 4–7·5 cm. long; petiole 1·5–3·5 cm. long before first pair of leaflets; leaflets cuneate, apex retuse or emarginate, mucronate, glabrous above, shortly appressedly pubescent below, 1·2–2 cm. long, 0·5–1 cm. broad. *Stipules* ovate-cordate, acuminate, 5–6 mm. long. *Peduncles* terminal and leaf-opposed, 6–22 cm. long, few-flowered towards apex. *Flowers* purple, 1·3–1·5 cm. long. *Bracts* ovate, 3–5 mm. long, soon caducous. *Calyx* sparsely pubescent, lobes lanceolate, subequal to tube. *Style* bearded. *Legumes* linear, 3·5–4 cm. long, 0·7 cm. broad, glabrous.

Natal.—Elandskop district: Sevenfontein near Boston, *Wylie* [Wood 5219] (N.); *Wylie* [Wood 9928] (N., Z., P., B.H.); Maritzburg district: Zwartkop, *Wood* 10235 (N., P.); *Wood* 11142 (N.).

This plant has been named in honour of Mr. J. Wylie who, for many years, worked with the late Dr. Medley Wood. On his many trips throughout Natal and Zululand he collected extensively, many of his specimens being new to science.

54. **T. grandiflora** (Ait.) Pers. Syn. 2.329 (1807); DC. Prodr. 2.251 (1825); Spreng. Syst. Veg. 3.232 (1826); Ecklon and Zeyher Enum. Pl. Afr. Aust. Extratrop. 246 (1835); E. Mey. Comm. Drège Pl. Afr. Aust. 1.1.110 (1836); Cape Plants, Krauss and Engler, 54 (1846); Harvey in Harv. and Sond. Fl. Cap. 2.209 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Bolus and Wolley Dod in Trans. S.A. Phil. Soc. 14.3.257 (1903); Zahlbr. Ann. K. K. Naturhist. Hofmus. 20.3 (1905); Wood Fl. of Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Burtt Davy and Pott in Ann. Tvl. Mus. 3.3.146 (1912); Die Veg. der Erde 9.3.590 (1915); Bot. Survey S.A. Mem. 1.64 (1919); Bews Fl. Natal and Zululand 111 (1921); Watt and Breyer-Brandwyk Med. and Pois. Pl. S.A. 74 (1932).

Syn. *Galega grandiflora* Ait. Hort. Kew 3.70 (1789); Vahl. Symb. 2.84 (1791); Thunb. Prodr. 134 (1800); Willd. Sp. Pl. 3. ii. 1244 (1803); Linn. Syst. Nat. 6.1215 (1806); Ait. Hort. Kew ed. 2.4.356 (1812); Thunb. Fl. Cap. ed. Schultes 601 (1823); Bot. Reg. 9 t. 769 (1824); Juel, in Plantae Thunberg 221 (1918); *Apodynomene grandiflora* E. Mey. Comm. Pl. Afr. Aust. 111 (1835–36); Hook. Lond. Journ. Bot. 2.88 (1843); Krauss Fl. des Cap und Natallandes 54 (1846); *Galega rosea* Lam. Encycl. 2. 599 (1786) sec. Persoon Syn. 2.329 (1807).

Type specimen, *Aiton* Cult. Hort. Kew is non extant. Aiton (1789) cites *Galega grandiflora* as being figured in L'Heritier Stirp. nov. t. 44, but according to Britten and Woodward Journ. Bot. 43.270 (1905), this plate was never published. Aiton (1812) withdraws this reference in the second edition of his "Hortus Kewensis."

Fruticose, erect. *Stems* subglabrous to densely pubescent. *Leaves* up to 7·5 cm. long, shortly petiolate, 4–8-jugate; leaflets variable in length and breadth, cuneate-oblong, obcordate or sometimes almost lanceolate, obtuse or acute, retuse or mucronulate, glabrous or pubescent above, canescent below, 1·3·8 cm. long, 0·4·1·8 cm. broad. *Stipules* broadly ovate, 0·5–1·3 cm. long. *Peduncles* terminal and opposite leaves, 3·12 cm. long, fasciculato-corymbose at apex; young flowers enclosed by broad ovate deciduous bracts up to 1·8 cm. long and 1 cm. broad at base. *Flowers* up to 2 cm. long, pedicellate; pedicels 0·5–1·3 cm. long. *Vexillum* densely fulvescent without. *Calyx* thinly to densely pubescent, tube up to 3 mm. long, lobes subulate, unequal, two upper slightly shorter than tube, lateral and lowest 2·5–3·5 mm. long, lowest longest. *Ovary* 1·4–1·6 cm. long, hairy along sutures. *Style* bearded. *Legumes* 4–7·5 cm. long, 0·9–1 cm. broad, linear, compressed, glabrous, thinly hairy along sutures.

Cape.—Humansdorp district: Clarkson, *Penther* 2473 (V., B.); *Thode* A 812 (K., N., P.); Kabeljouws river, *Penther* 2469 (B.); Humansdorp, *Rosenbrock* 456 (B.); *West* 92 (K.); about 7 m. N. of Humansdorp, *Schonland* 3044 (A.M.); between Gamtoos River and Humansdorp, *West* 207 (B.H.); Uitenhage district: Diep Valley, Zitzikamma, *Fourcade* 780 (A.M.); Zitzikamma, *Krauss* 29 (V.); ad sylv. marginis in Zitzikamma, *Murray* 39 (Z., B.); among shrubs in district of Uitenhage, *Ecklon* and *Zeyher* (B.); Hofman's Bosch near St. Albans, *Britten* 1053 (A.M., Pa.); on banks of the Krom River, *Bowie* 1 (K., B.M.); Krom River, *Zeyher* (A.M.); *Thunberg* (U., B.M.); *Pappe* (K.); Albany district: in humidis vallibus pr. Grahamstown, *Read* (K.); hill above Grahamstown, *Prior* (K.); Featherstown Kloof, *Rennie* 179 (S.A.C.); Grahamstown, *Rogers* 1579 (K.); *Rogers* 336 (B.M.); *Schonland* (Z., B.); *Schlechter* 2617 (B., A.M.); *Williamson* 20 (B.M.); *Daly* and *Sole* 131 a (P.); and *Daly* and *Sole* 1013 (A.M.); *Gower* 4 (P.); *Alexander* 112 (K.); *Bolus* (T.M.); *Haagner* 235 (Z., B.); ad ripas fluviorum pr. Grahamstown, *MacOwan* 1929 (A.M.); *MacOwan* 206 (B.M., Z., N.); edge of forest, Howison's Poort, *Zeyher* (S.A.M.); dry rocky hills at Grahamstown, *Bunbury* 41 (B.M.); Signal Hill, *Bolus* 1930 (B.H.); in collibus inter Grahamstown and Coldstream, *Bolus* 10634 (B.H.); inter Grahamstown and Assegai Bosch, *Zeyher* (K., S.A.M.); on stony hills between Grahamstown and Assegai Bosch, *Zeyher* 191 (V., O.); Flats, Oudebosch, *Fourcade* 866 (K., Z., A.M.); Trapps Valley, *Daly* 631 (A.M., P.); Garrow, *Burtt Davy* 11597 (P.); Albany, *Harvey* 191 (K., B.M.); Victoria district, near Alice, *Cooper* 374 (K., B.M., Z., V., P.); Kingwilliamstown district: *Drège* (K.); Hoffmanskloof and Driefontein, *Drège* (S.A.M.); Stockenstroom district: Elands River above Waterfall, Stockenstroom, *Scully* 216 (P.); Stutterheim district: Amabele, *Moss* 20491 (W.); Fort Cunynghame, *Schonland* 80 (A.M.); pr. Fort Cunynghame, *Bolus* 21777 (B.H.); Bathurst district: Port Alfred, *Rogers* 28073 (Z.); East London district: East London, *Breyer* (T.M.); *Galpin* 3299 (A.M., P.); *Rogers* 17015 (Z., W.); *Thode* (S.); *Ottley* 2529 (B.M., W.); Nahoon River Valley, *Smith* 3750 (K., P.); Blood River Valley, Southernwood, *Smith* 3666 (P.); Kei Road, *Schlechter* 6134 (B., A.M.); along road to Buffalo Bridge, *Colmer* (G.U.C.); Komgha district: among shrubs near Komgha, *Flanagan* 632 (Z., S.A.M., B.H., A.M.); Komgha, *Krook* [Penther 2540 and 2545] (V., B.); Kentani district: *Pegler* 458 (K., B.M., P., S.A.M., A.M.); Qutosa, Kentani, *Edwards* [Moss 17581] (W.); Kaffraria, *Cooper* 82 (K., B.M., Z., G., V., N., P., B.H.); Pondoland district: Port St. Johns, *Schonland* 4046 (A.M.); *Moss* 2723 (W.); *Bachmann* 618 (B.); Libode, *Schonland* 3895 (A.M.); apud litus ad ostia fl. Umkwani, *Tyson* 2624 (K., B.M., Z., S.A.M.); Pondoland, *Bachmann* 609 and 610 (B.); *Bachmann* 611 (B.M., B.); *Bachmann* 612 (Z., B.); an moorig Rand v. Sandsteinbachen, *Beyrich* 252 (B.); inter Omsamwubo and Omsamcabo Rivers, *Drège* (K.); Umtata district: Colossa Umtata, *Krook* [Penther 1612] (V.,B.); East Griqualand, Mt. Ayliffe district: In montibus pr. Mt. Ayliffe, *Tyson* 2752 (P., S.A.M., S.).

Natal.—Port Shepstone district: Margate, *Beardmore* [Moss 15139] (W.); near Murchison, *Wood* 3022 (K., N.); Marburg, *Rogers* 544 (B.M.); Ixopo district: open ground, Umgoye, near Dumisa, *Wood* 3865 (B.M., Z.); Umzinto district: Ifafa, *Rudatis* 42 (B.); Durban district: coastland, *Sutherland* (K.); Pinetown district: Northdene, wood near Krantzkloof, *Rogers* 24460 (T.M.); Camperdown district: near, river Umlaas, *Evans* 345 (N.); Impendhle district: Boston, *Wylie* [*Wood* 9928] (B.M.); Inanda district: Inanda, *Rehmann* 8420 (Z.); edge of wood, Inanda, *Wood* 5589 (B.); Inanda, *Wood* 289 (B.M., N., K., S.A.M., B.H.); Zululand, Eshowe district: margins of forest, Eshowe, *Galpin* 12159 (K., V., P.); Eshowe, *Rogers* 24460 (Z., A.M., W.); *Forbes* [N.H. 20538] (N.); *Forbes* 708 (N.); plantations, Port Durnford, *Kotze* 22 (P.); Nkandhla district: Melmoth, *Mogg* 4574 (P.); Babanango, *King* 450 (N.); Ngoye, *Wylie* [*Wood* 10363] (Pa.); no definite locality, *Gerrard* and *McKen* 302 (K., B.M., Pa., V.); *Gerrard* 1087 (K.); *Gerrard* 1752 (K., B.M., Pa.).

No Definite Locality.—*Ecklon* and *Zeyher* 1629 (O., Pa., G., V., B.); *Zeyher* 2395 (P.); *Barber* (A.M.); *Drège* [Herb. E. Meyer 5468] (B.); *Drège* [Herb. E. Meyer 5469] (B.); *Drège* 415 and 416 (V.); *Drège* (O.); *Drège* 2395 (V.); *Ecklon* and *Zeyher* 810 (Z.); *Krebs* 110 (G.); *Krebs* s.n. (B.); *Rohde* (V.); Talbot (K.); *Verreaux* (G.); *Burchell* 3867 (K.); *Cooper* 2224 (K.); *Corvailla* (V.); *Hennegart* (P.); *Mund* and *Maire* (B.); *Masson* (B.M.).

A decoction of the root of this plant, known to the Zulus as "iHlozane" is used as a parasiticide.

55. **T. glomeruliflora** Meisn. in Hook. Lond. Journ. Bot. 2.86 (1843); Cape Plants, Krauss and Engler 54 (1846); Harvey in Harv. and Sond. Fl. Cap. 2.209 (1861–62); Wood Fl. Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Bews Fl. Natal and Zululand 111 (1921).

Type specimen, *Gueinzius*, in Herbarium, Kew.

Suffruticose, erect, whole plant more or less greyish pubescent. *Stems* branching, terete. *Leaves*–3–12-jugate, 3–10·5 cm. long, petiolate; leaflets 1·5–4 cm. long, 0·5–1·2 cm. broad, narrow oblong, obtuse or subacute, mucronate, thinly pilose or glabrous above, more or less densely canescent below; petiolules about 2 mm. long. *Stipules* lanceolate or ovate-lanceolate, striate, 0·5–1 cm. long. *Peduncles* terminal and leaf-opposed, 11–20 cm. long. *Flowers* 1·8–2·2 cm. long 2–3 together in interrupted spicate glomerules. *Bracts* ovate, acuminate, 0·9–3·5 cm. long, deciduous. *Pedicels* up to 1·2 cm. long, short at first but lengthening as the flower develops. *Calyx*-tube 0·9–1·5 cm. in diam., lobes 3–5 long and two upper connate and slightly shorter. *Vexillum* sericeous without, 1·8–2 cm. mm. long, and broad. *Ovary* 1·4–1·8 cm. long, densely hairy along sutures. *Style* 0·6–1 cm. long, bearded. *Legumes* hairy along sutures, compressed, 5–6 cm. long, 8–9 mm. broad.

Cape.—Pondoland: hillside, Signal Hill, Port St. Johns, *Galpin* 9537 (K., P.); forests, Port St. Johns, *Moss* 2740 (W.); amongst rocks in sea sand, Port St. Johns, *Howlett* 52 (P.).

Natal.—Port Shepstone district: sandy grassy places near beach, Uvonga, *Thode* (B., S.); Umzinto district: Park Rynie, *Wood* 12367 (N., P., T.M.); Friedenau, Umgaiflat, *Rudatis* 280 (B., P.); Durban district: Port Natal, *Gueinzius* (K.); Berea, Durban, *Wood* 4843 (B.M., G., N., P., B.H.); cult. in Botanic Gardens, Durban, *Wood* 12564 (K., N.); Sydenham, *Wood* 11927 (A.M.); Rooikop near Sydenham, *Forbes* 543 (N., T.M.); Springfield, *Wood* 13062 (N., T.M.); Pinetown district: inter Pinetown and Umbilo, *Rehmann* 8044 (K.); Greytown district: near Greytown, *Wood* 5984 (V., B., B.H., N.); Impendhle district: Boston, *Wood* 11400 (N.); Tugela district: Chaka's Kraal, *Thode* (B.); Zululand, Mtunzini district: Mtunzini, *Wood* 11360 (N.,P.); *Mogg* 4348 (A.M., P., B.H.); Eshowe district: Port Durnford Plantations, *Kotze* 22 (P.); Ngoye, *Wylie* [*Wood* 10345]

(N., P.); *Wood* 10363 (P.); *Wylie* [*Wood* 8482] (B.); *Wylie* [*Wood* 5654] (G., P.); open ground, *Wood* 722 (B.M., B.); *Wood* 3865 (K., S.A.M., B.M.); Umfolosi district: St. Lucia Bay, *Pole-Evans* 3647 (P.).

No Definite Locality.—*Gueinzius* 306 (V.).

56. **T. subulata** Hutch. and Burtt Davy in Fl. Tvaal. 1.2. p. XXI and p. 377 (1932).

Type specimen, *Galpin* 843, in Herbarium, Kew.

Suffruticose, stems erect or ascending. *Leaves* pinnate, 4–8-jugate, 5–10 cm. long; leaflets 1·4·3 cm. long, 0·5–1·5 cm. broad, oblong, retuse, mucronulate. *Stipules* broad, more or less ovate, striate, sparsely ciliate and pilose without. *Peduncles* terminal and axillary, up to 2 cm. long, few flowered. *Flowers* 1·5–2 cm. long; bracts acute, 5–7 mm. long, striate, subglabrous, caducous; pedicels 6 mm. long. *Calyx*-tube 2·5–3 mm. long, 8 mm. in diam., lobes linear-subulate, 4–7 mm. long, much longer than the tube, subglabrous. *Vexillum* 1·5–1·7 cm. long, 1·1–1·8 cm. broad, pubescent without. *Ovary* 1·1–1·5 cm. long, thinly hairy along the sutures. *Style* 5 mm. long, bearded along the inner side. *Immature pods* 4·5 cm. long, 0·6 cm. broad, glabrous.

Cape. East Griqualand: in graminosis ad rivulos "Clydesdale" ad flumen Umzimkulu, *Tyson* 1434 (K., A., G., V., B., P., S.A.M., S.); apud rivulos circa Clydesdale, *Tyson* 2047 (K., Z., P.).

Natal.—Umzinto district: Friedenau, Umgai Flat, *Rudatis* 308 (B.); Pinetown district: Trappisten Kolonie, Mariannhill, *Landauer* 236 (B.); Greytown district: grassy places near streams, De Rust, Greytown, *Thode* (B.).

Transvaal. Barberton district: Highland Creek, Barberton, *Galpin* 843 (K., N., P., S.A.M.); Moodies Hill near stream, *Thorncroft* (K., T.M.); Roses Creek, *Thorncroft* 36 (T.M.).

57. **T. shiluwanensis** Schinz in Vierteljahrsschr. Nat. Ges. Zurich 52.425 (1907); Burtt Davy Fl. Tvaal. 1.2.379 (1932).

Syn. *Tephrosia spathacea* Hutch. and Burtt Davy in Fl. Tvaal. 1.2. pp. XXXI and 377 (1932) in part.

Tephrosia Meisneri Hutch. and Burtt Davy l.c.

Type specimen, *Junod* 2355, in Botanisches Museum, Zurich.

Suffruticose, erect, sparsely branched, branches grey-pilose when young, at length glabrous. *Leaves* 3–6-jugate, petiolate, 5·5–13 cm. long; leaflets oblong-obovate or cuneate, truncate or emarginate, mucronate, glabrous above, thinly appressedly grey-pilose below, 1·4·5 cm. long, 0·4–1·3 cm. broad. *Stipules* ovate-acuminate, pilose, densely ciliate along the margins, 0·5–1 cm. long. *Peduncles* axillary and terminal, racemosely few-flowered at apex, 8–11 cm. long, terminal peduncle occasionally up to 20 cm. long; pedicels 2–9 mm. long; flowers subtended by broad ovate bracts, soon caducous. *Flower* 1·5 cm. long. *Calyx* long pilose, tube 3 mm. long, 8 mm. in diam., lobes unequal, 2·5–3·5 mm. long. *Vexillum* densely clothed with adpressed silky golden-brown hairs without, about 1·5 cm. long and 1·4 cm. broad. *Ovary* 1·1 cm. long. *Style* 5 mm. long, bearded along inner side. *Legume* 4 cm. long, 7 mm. broad, glabrous.

Transvaal. Zoutpansberg district: bas pays, Shiluwane, *Junod* 2355 (Z., G.); *Junod* 1106 (K., Z.) [cited as *T. spathacea* in Fl. Tvaal.]; *Junod* 117 (Z., G.); in cliv. mont. Houtboschberg, *Schlechter* 4417 (B.); Houtbosch, *Rehmann* 6228 (K.); and 6229 (K., Z.); Lydenburg district: hillsides, Sabie Valley, *Galpin* 13598 (B.M., P.); Governments Spruit, north of town, Lydenburg, *Wilms* 341 (K.), [type of *T. spathacea* Hutch. and B. Davy] Spitzkop Goldmine, *Wilms* 341 bis (Pa., G.); Louis Trichardt, *Young*, in Herb. Moss 17248 (W.); Ermelo district: rock crevices, Blaaupan A. *Moss* 16326 (W.).

58. **T. albissima** H. M. Forbes sp. nov., affinis *T. macropodae* Harv., sed caulibus multo brevioribus, omnibus partibus dense longeque albido-pilosis, lobis calycis tubo longioribus differt.

Caules simplices, ascendentes vel decumbentes, e basi ramosi, pilis longis albidis pilosi. *Folia* 1–6 jugata, 2·5–11 cm. longa; foliola obovato-cuneata, retusa, mucronata, 2·5–5·5 cm. longa, 0·8–2·2 cm. lata, supra glabra, subtus pilosa; stipulae ovatae, pilosae, 0·7–1·5 cm. longae, 3–5 mm. latae, 5–7 nervatae; pedunculi 7–12 cm. longi; bracteae ovatae, mox caducae. *Flores* 1·8–2 cm. longi; pedicelli 5–8 mm. longi; dentes calycis lineari-lanceolati tubo excedentes; ovarium marginibus pilosis; stylus pilosus.

Type specimen, *Wylie* (N.H. 21590), in Natal Herbarium, Durban.

Stems simple, ascending or decumbent, branching from the base, clothed with long white hairs. *Leaves* 1–6-jugate, 2·5–11 cm. long; leaflets obovate-cuneate, retuse, mucronate, glabrous above, pilose below, 2·5–5·5 cm. long, 0·8–2·2 cm. broad. *Stipules* broad, ovate, 5–7 nerved, pilose, 0·7–1·5 cm. long, 3–5 mm. broad. *Peduncles* terminal, 7–12·5 cm. long, flowers almost capitate in a short dense raceme at the apex. *Flowers* purple, 1·8–2 cm. long; pedicels 5–8 mm. long, pilose, bracts ovate, soon caducous. *Calyx* pilose, lobes longer than tube, linear lanceolate. *Ovary* with margins densely pilose. *Style* bearded.

Natal.—Krantzkop district: Greytown, *Wylie* (N.H. 21590) (N., P.).

59. **T. cordata** Hutch and Burtt Davy in Fl. Tvaal. 1.2 p. XXXI and p. 377 (1932).

Type specimen, *Burtt Davy* 2886, in Herbarium, Kew.

Suffruticose. *Stems* ascending, soon glabrescent. *Leaves* pinnate, 5–6- jugate, 3–13·5 cm. long; leaflets oblong, 1–3·4 cm. long, 0·4–1·7 cm. broad, mucro up to 2 mm. long, glabrous above, thinly appressedly pilose beneath. *Stipules* broadly cordate at base, broadly ovate, very acute, 1–2·5 cm. long, 0·5–1·2 cm. broad. *Peduncles* terminal, few-flowered towards apex, 4–14 cm. long, pedicel 0·5–1 cm. long. *Calyx* pilose, tube 9 mm. in diam., 3 mm. long, lobes lanceolate, all about 2 mm. long. *Vexillum* pilose without, 1·4 cm. broad, 1·6 cm. long. *Ovary* 1·3 cm. long, hairy along the margins. *Style* 8 mm. long, bearded along inner surface. *Legumes* 3·5–5 cm. long, 6–8 mm. broad, glabrous, narrow-oblong, flat.

Transvaal.—Ermelo district: crevices, Blaaupan A. *Moss* 16326 (W.); Carolina district: Billy's Vlei, *Mitchell* (Pa.); Lydenburg district: Kluft bei Stephen Schumaan I. v. Lydenburg, *Wilms* 344 (B.M., B.); amongst rocks, Suikerbos Kop, Dullstroom, *Galpin* 13134 (K., B.H., P.); Barberton district: Kaapsche Hoop, *Rogers* 21011 (P.); *Rogers* 21111 (K., B.M., Z., P., W.); Duivels Kantoor near Kaapsche Hoop, *Pole-Evans* 1001 (P.); Zoutpansberg district: Louis Trichardt, *Young* in Moss Herb. 17248 (W.).

Swaziland.—In kloofs, Mbabane, *Burtt Davy* 2886 (K., B.M., P.); *Rogers* 11610 (B.H.); grassy hillsides near Dalriach, Mbabane, *Bolus* 11819 (B.H.).

Portuguese East Africa.—Mozambique, *Schlechter* s.n. (B.).

60. **T. spathacea** Hutch. and Burtt Davy Fl. Tvaal. 1.2. pp. XXXI and 377 (1932).

Suffruticose. *Stems* erect or ascending, thinly pilose when young, glabrous later. *Leaves* 2–4-jugate, 2·5–8 cm. long, petioled; leaflets elliptic- or oblong-cuneate, mucronate, thinly pilose below when young, glabrous on both sides later, 1·5–3 cm. long, 0·6–1·5 cm. broad. *Stipules* ovate acuminate, up to 1 cm. long, 0·5–0·6 cm. broad. *Peduncles* terminal and leaf opposed, few flowered towards apex. *Flowers* small, bracts acuminate. *Calyx* teeth scarcely exceeding the tube, subulate acuminate. *Legumes* linear, flat, very sparsely ciliate along sutures, later quite glabrous.

Tembuland.—In collibus prope flumen Chwenka, *Bolus* 8877 (P.).

Natal.—Maritzburg, *Phillips* 3461 (P.); Zululand, Mahlabathini, *Gerstner* 4247 (N.).

Swaziland.—Hlatikulu, *Pierce* (P.).

Transvaal.—Middelburg district: Pan, Middelburg, *Burtt Davy* 13254 (P.), *Hodgson* (P.); near Witbank Stn., *Gilfillan* (P.); Zoutpansberg district: New Agatha, *McCallum* (P.).

61. **T. Galpinii** H. M. Forbes sp. nov., affinis *T. albissimae* H. M. Forbes, sed caulibus longioribus, foliis nunquam albido-pilosis, lobis calycis tubo aequilongis differt.

Caules ascendentes vel decumbentes. *Folia* 1–4-jugata, 2·5–8 cm. longa; foliola elliptica vel oblongo-cuneata, mucronata, 2–4 cm. longa, 0·5–0·7 cm. lata, supra glabra subtus leviter pubescentia vel glabrescentia; pedunculi 10–22 cm. longi; bracteae ovatae 5–7 mm. longae, mox caducae. *Flores* 1·3–1·5 cm. longi; dentes calycis tubo aequilongi; stylus leviter pilosus. *Fructus* non visus.

Type specimen, *Galpin* 14755, in National Herbarium, Pretoria.

Stems ascending or decumbent, simple or branching a little, glabrescent. *Leaves* petioled, 1–4-jugate, 2·5–8 cm. long; leaflets elliptic or oblong-cuneate, mucronate, glabrous on both sides or sparsely appressedly pubescent below, 2–4 cm. long, 0·5–1·5 cm. broad. *Stipules* broadly ovate, acuminate, 1 cm. long, 0·5–0·7 cm. broad. *Peduncles* 10–22 cm. long, terminal and axillary, few flowered towards apex. *Bracts* ovate, 5–7 mm. long, soon caducous. *Flowers* purple, 1·3–1·5 cm. long. *Calyx* glabrous or very sparsely pilose, calyx teeth equal in length to tube. *Style* thinly bearded. *Legumes* not seen.

Natal.—Greytown district: Greytown, *Galpin* 14755 (P., N.); *Galpin* 14727 (P.); *Wylie* (N.).

The late Mr. E. E. Galpin, in whose honour this plant has been named, was well known in the botanical world. He was an indefatigable collector and a keen botanist, and his contribution to the botanical knowledge of South Africa is invaluable.

62. **T. unifolia** H. M. Forbes sp. nov., affinis *T. Galpinii* H. M. Forbes, sed caule breviore, folio unico, nervis secundis nigrescentibus differt.

Caules decumbentes vel ascendentes, graciles, parce pubescentes. *Folia* 1–3-jugata, 0·5–1·7 cm. longa; foliola elliptico-oblonga, mucronata, supra glabrescentia pallidaque, subtus parce pubescentia, usque ad 7 mm. longa; pedunculi 7–23 cm. longi, pauciflorae; bracteae ovato-acuminatae, 3–4 mm. longae. *Flores* 1·6–1·7 cm. longi; pedicelli 5·5–8 mm. longi; dentes calycis tubo subaequilongi; stylus pilosus. *Fructus* complanatus.

Western Zululand. No definite locality, March 1895, *Baker* [*Evans* 566]. Type in Natal Herbarium.

Stems decumbent or ascending, slender, thinly pubescent. *Leaves* shortly petioled, 1–3-jugate, 0·5–1·7 cm. long; leaflets elliptic-oblong, mucronate, mucro usually recurved, glabrous and light green above, thinly hirsute, secondary veining dark below, 1·7–4·5 cm. long, 0·4–1 cm. broad. *Stipules* ovate-acuminate, up to 7 mm. long. *Peduncles* 7–23 cm. long, laxly few flowered towards apex. *Bracts* subtending young flowers, ovate, acuminate, 3–4 mm. long, soon caducous; pedicels 5·5–8 mm. long. *Flowers* purple-red, 1·6–1·7 cm. long. *Calyx* pubescent, lobes sub-equal to or very slightly longer than tube. *Vexillum* densely silky without. *Style* bearded. *Legumes* (immature) 3·5 cm. long, 6 mm. broad, flat, appressedly hairy along sutures.

Only one gathering of this plant was seen. Apparently several stems arise from the root-stock, each stem bearing only one leaf and one or two peduncles.

63. **T. radicans** Welw. ex Baker in Oliv. Fl. Trop. Afr. 2.121 (1871); O. Kuntze Rev. Gen Pl. 1 (1891); Die Veg. der Erde 9.589 (1915); Bak. f. Leg. Trop. Afr. 1.214 (1926).

Syn. *Cracca radicans* (Welw.) O. Kuntze, Hiern in Cat. Afr. Pl. Welw. 122; *Tephrosia radicans* Welw. var. *rhodesica* Bak. f. in Journ. Bot. 37.430 (1899).

Type specimen, *Welwitsch* 2082, in Herbarium, British Museum (Natural History), South Kensington, London.

A wide trailing perennial herb with copiously branched, slender, flexuous, prostrate stems, 6–9 m. long, densely clothed with fine spreading pubescence. *Leaves* petiolate, 5–7-jugate; leaflets obovate-oblong, truncate, mucronate, grey-green and glabrescent above, persistently grey silky below, midrib tawny, 0·7–2·5 cm. long, 0·4–1·3 cm. broad. *Stipules* ovate, 3–5 mm. long. *Peduncles* usually terminal, laxly 6–15-flowered, 2·5–10 cm. long. *Flowers* 1–1·1 cm. long; pedicels 0·3–1 cm. long; bracts lanceolate, minute. *Calyx* pubescent, tube 5–7 mm. in diam., 2–2·5 mm. broad, lobes lanceolate, cuspidate, two upper approximately 1·5 mm. long, lateral and lowest 2–3 mm. long. *Vexillum* silky on back, 1–1,1 cm. long, 7–8 mm. broad. *Ovary* 4–5 mm. long, densely and finely pubescent. *Style* bearded along inner surface. *Legumes* 2–3-seeded, oblong, 1–2·5 cm. long, 5–7 mm. broad, pubescent.

Angola. Huilla, in pratis humidis ad formicar monticul. de Varzeas de Catumba, *Welwitsch* 2082 (K., B.M., Pa., G., B.); high plateau between Humpata and Lubuyo, *Pearson* 2589 (K., B.).

Transvaal. Pietersburg district: in plantiebus graminosis prope pagum, Pietersburg, *Bolus* 10876 (K., V., B., Z., N., S.A.M., B.H.); Makapansberge, Streydpoort, *Rehmann* 5529 (K.); Marabstad, *Schlechter* 4679 (B., A.M., T.M., Pa., B.H.); Pyramid Estate near Potgietersrust, *Galpin* 8959 (Z., P.). Barberton district: near Research Station, Nelspruit, *Liebenberg* 2581 (P.).

Southern Rhodesia. Plumtree, *Eyles* 3295 (S.A.M., B.H.); Bulawayo, *Rogers* 13662 (P., S.A.M., A.M.); *Rand* 52 (B.M., A.M.); Matopos, *Rattray* 407 (B.M.); *Flanagan* 3099 (B.H.); Lydiate Siding, *Eyles* 955 (K., S.A.M.); Odanzi River Valley, *Teague* 474 (K., H.B., S.A.M.); no definite locality, *Hislop* 779 (K.).

Northern Rhodesia. Makolu, *Young* 6 (B.M.); Kalomo, *Rogers* 820 (K.); *Trapnell*: 1015 (K.); Choma, *Rogers* 8011 (K., A.M., Z.); Mazabuka, *Rogers* 8730 (K., N., T.M.) *Rogers* 25127 (K., Z., T.M.); Mumbuwa, *Macaulay* 391 and 1151 (K.).

In the Journal of Botany 37.430 (1899), Baker fil., describes a variety, var. *rhodesica*, which he says differs from *T. radicans* as follows: "Leaflets generally 7, rather broader than in the type. Legume broader than type." In my opinion I do not think this variety can stand, for the type specimen, *Welwitsch* 2082, has quite a few leaves with seven leaflets, also the breadth of the leaflets and legumes is too variable a character to differentiate between typical *T. radicans* and the variety.

61. **T. zuluensis** H. M. Forbes sp. nov., affinis *T. macropodae* sed petiolis brevioribus differt.

Caules decumbentes vel ascendentes, pubescentes. *Folia* 2–3-jugata, 1 cm. longa, petiolis brevibus; foliola cuneato-oblonga, obtusa, mucronulata, 1·7–3·5 cm. longa, 0·75–1·5 cm. lata, supra glabra, subtus parce pubescentia; stipulae ovato-cordatae, acuminatae, 5–6·5 mm. longae, 3–5·5 mm. latae; pedunculus usque ad 24 cm. longus, bracteae ovatae, usque ad 6·5 mm. longae. *Flores* 1·5 cm. longi; pedicelli 5·5 mm. longi, pubescentes; dentes calycis lanceolati, tubo excedentes; stylus pilosus. *Fructus* circiter 4·2 cm. longus, 0·6 mm. latus, marginibus hirsutis.

Zululand.—Nkandhla, J. *Wylie* (Wood 8966) in Natal Herbarium, Type.

Stems procumbent or ascending, pubescent. *Leaves* 2–3-jugate, 1 cm. long, petioles very short; leaflets cuneate-oblong, obtuse, mucronate, glabrous above, thinly pubescent and with dark brown secondary veining below, 1·7–3·5 cm. long, 0·75–1·5 cm. broad;

petiolules 1 mm. long, densely pilose. *Stipules* ovate-cordate, acuminate, pilose, 6–8 nerved, 5–6·5 mm. long, 3·5–5 mm. broad. *Peduncles* terminal and axillary, up to 24 cm. long, few-flowered at apex. *Bracts* broadly ovate, pilose, up to 6·5 mm. long, soon caducous; pedicels up to 5·5 mm. long, lengthening as flowers develop, pilose. *Flowers* 1·5 cm. long, purple. *Vexillum* suborbicular, densely silky without. *Calyx* lobes longer than the tube, lanceolate, long pilose. *Style* bearded. *Legumes* (immature), 1·2 cm. long, 6 mm. broad, flat, pilose along margins, 7–8 seeded.

Except for the very short petioles, this plant has the appearance of *T. macropoda*, particularly the more robust forms of that species.

65. **T. macropoda** Harv. in Harv. and Sond. Fl. Cap. 2.240 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Zahlbr. Ann. K. K. Naturhist. Hofmus. 20.3.25 (1905); Wood Fl. Natal 42 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Marloth Dict. Common Names 112 (1917); Pott in Ann. Tvl. Mus. 6.4.128 (1920); Bews Fl. Natal and Zululand 111 (1921); Watt and Breyer-Brandwyk Med. and Pois. Pl. S.A. 74 (1932).

Syn. *Apodynomene macropoda* E. Mey. Comm. Pl. Afr. Austr. 112 (1836); Hook. Lond. Journ. Bot. 2.88 (1843); Cape Plants, Krauss and Engler 54 (1846); *Tephrosia triphylla* Harms. in O. Kuntze Rev. Gen. Pl. 3.2.57 (1893). *Cracca macropoda* (E. Mey) O. Kuntze Rev. Gen. Pl. 3.2.57 (1893).

Type specimen, *Drège* (Herb. Meyer 5471), in Botanisches Museum, Berlin-Dahlem.

The two co-type specimens *Drège* (inter Gekau and Bashee) and *Drège* (inter Omtata and Omgaziana) are in the Herbarium, Kew.

Stems several from a large tuberous root-stock, procumbent, more or less robust, up to 3 feet long. *Leaves* 1–3 jugate, 6–14·5 cm. long, petioles usually long before first pair of leaflets; leaflets narrow to broadly elliptical or oblong, glabrous above, pubescent or glabrescent below, 2–6·5 cm. long, 0·6–3 cm. broad. *Stipules* broadly cordate-ovate, 0·5–1·2 cm. long, 0·5–1 cm. broad. *Peduncles* terminal and leaf-opposed, up to 48 cm. long, few-flowered at apex; bracts broadly ovate, bilobed at apex, soon caducous, 0·7–1·3 cm. long. *Flowers* large, 1·4–2·2 cm. long. *Calyx* teeth linear to linear-lanceolate, longer than tube. *Style* bearded. *Legumes* linear, flattened, glabrous, hirsute along sutures, up to 6 cm. long and 0·8 cm. broad.

Cape.—Albany district: grassy places, Botha's Hill Sprait, *MacOwan* 152 (N., S.A.M.); Kingwilliamstown district: Keiskamma, *Hutton* (K.); Komgha district: grassy hills near Komgha, *Flanagan* 511 (G., P., S.A.M., B.H.); Kentani, *Pegler* 1362 (P., B.H.); Transkei district: inter Gekau and Bashee, *Drège* (K.); Umtata district: in monte Engcobo, *Bolus* 8877 bis (B.H., P.); Baziza, *Baur* 59 (K.); inter Omtata and Omgaziana, *Drège* (K.).

Natal.—Port Shepstone district: Port Shepstone, *Weeks* 44 (W.); Beach Terminus, *Thode* (S.), flats behind dunes, Marburg, *Buchmann* 608 (B.); Dumisa, *Rudatis* 874 (K., B.M., V., Z., G., B., P.); Ixopo district: Ixopo, *Mogg* 2299 (P.); Scottburgh, *Howes* (P.); Mid Illovo, *Thode* (S.); Durban district: Merebank, *Wood* 235 (N., B.M., S.A.M., B.H.); Hilltop, Brighton Beach, *Forbes* 512 (N.); Jacobs, *Conrath* 236 (Z., B.); Port Natal, *Sutherland* (K.); Port Natal, *Gueinzius* 28 (V.); Port Natal, *Krauss* 451 (K., B.M., G., P.) and *Krauss* 244 (K., B.M., G.); near Durban, *Wood* 5494 (Pa., B.); Umgeni, *Rehmann* 8701 (Z.); Pinetown district: Pinetown, *Acutt* (P.); New Germany, *Indian Collector* (N.); among grass, Fields Hill, *Evans* 178 (N.); Krantzkloof, *Kuntze* (K.); Inchanga, *Engler* 2638 (B.); *Stohr* 27 (B.M.); *Frith* 122 (W.); Drummond, *Galpin* 10299 (P.); Bothas Hill, *McClean* 102 (P., N.); Camperdown district: Camperdown, *Franks* (K., N.); *Rehmann* 7722 (Z.); Pietermaritzburg district: Pietermaritzburg, *Wilms* (K., B.M.); Alberton near Maritzburg, *Mogg* 2177 and 6590 (P.); Cedara, *Phillips* 3461 (P.); Shafton, Howick, *Evans* (N.); Inanda district: Avoca, *Oliver* 158 (N.); in graminosis, Phoenix, *Schlechter*

2904 (B., A.M.); Oakfort, *Rehmann* 8514 (Z.); Inanda, *Wood* 816 (K., B.M., N., P.); Zululand, Mtunzini, *Mogg* 4436 and 5812 (P.); Eshowe, *Gerstner* 3830 (N.). No definite locality, *Gerrard* 31 (V., Pa., B.M.).

Transvaal.—Witwatersrand district: Brakpan, *Murray* (O.); Pretoria district: Koedoespoort, *Rehmann* 4629 (Z.); Middelburg district: Waterval Boven, *Rogers* 14405 (B.M., Z., W); Dullstroom, *Galpin* 13074 (K., P.); Witbank, *Rand* 45 (B.M.); Middelburg *Hewitt* (T.M.); Barberton district: eastern slopes, Saddleback Mountains, *Galpin* 1172 (P.); top and upper parts of Mt. Schagen, Barberton, *Liebenberg* 2498 (P.); Tweefontein Experimental Area, Sabie, *Wager* B.172 (P.); between Pilgrims Rest and Sabie, *Rogers* 21765 (Z.); Pietersburg district: Houtbosch, *Rehmann* 6232 (Z.); The Downs, Pietersburg, *Moss* and *Rogers* 325 and 326 (P.); Modjadjes near Pietersburg, *Rogers* 18029 (Z.); Zoutpansberg district: Messina, *Moss* and *Rogers* 25 bis (Z.); in clivis Mt. Elandspruitbergen, *Schlechter* 3997 (Z.).

Orange Free State.—Bloemfontein, *Snoek* (G.U.C.).

South Africa.—No definite locality: *Drège* 417 (V.); *Drège* (O.); *Hennegart* (Pa.). *Gueinzius* (K., Pa., V., AM., S.); *Gerrard* and *McKen* (K., B.M., Pa., V.); *Junod* 904 (Pa.); (G., Z) and 2532 (Z.); *Rehmann* 6231 (Z.) [cited as *T. spathacea* in Fl. Tvaal.]; *Watt* and *Brandwyk* 686 (P.).

T. macropoda is an extremely variable species. Meyer, in his description in Comm. Pl. Afr. Austr., divides the material into two varieties, as follows: -

A. *latifolia*. Leaves 2–3-jugate, leaflets broad, oblong, obtuse, roughly hairy below or subglabrous; peduncles generally hispidulous.

B. *angustifolia*. Leaves 3-5 jugate, leaflets lanceolate–oblong, sericeous-argenteous; peduncles glabrescent or sparsely appressedly pilose.

Harvey in "Flora Capensis" does not maintain the varieties.

After a preliminary examination of a large amount of material, it seemed feasible to resuscitate the variety *angustifolia*. A further study of the material, however, showed that it would be very difficult to differentiate clearly, except between the forms with the very broad leaflets and the forms with the very narrow leaflets, for leaflets on the same specimen vary from broad to medium and medium to narrow.

The form with the narrowest leaflets seems to occur chiefly in the Eastern Province of the Cape and is very frequently confused with *T. aemula*. The most robust form with very broad leaflets occurs chiefly along the coastal areas of Natal and Zululand. Further inland in Natal and throughout the Transvaal the plants become less robust and the leaflets narrower.

Another variable character is the trifoliolate leaf, a character which led Harms to describe this plant as *T. triphylla*. Sometimes all the leaves on one stem will be trifoliolate while other stems arising from the same root-stock will bear 2 3-jugate leaves.

Three specimens collected by Tyson in East Griqualand are, in my opinion, dwarf forms of *T. macropoda*. The stems and petioles are shorter than in typical *T. macropoda*, but they agree otherwise.

These specimens are *Tyson* 1430 (K., S.A.M., P.); *Tyson* 1579 (K., B.H.) and *Tyson* 2092 (K., S.A.M., B.H.).

This plant is widely known as a fish-poison and the Zulus also use the powdered root as an insecticide, as well as for medicinal purposes. The Zulu name is "iLozane."

66. **T. aemula** (E. Mey) Harv. in Harv. and Sond. Fl. Cap. 2.210 (1861 62); O. Kuntze Rev. Gen. Pl. 1.174 (1891); Wood Fl. Natal 41 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Bot. Survey S.A. Mem. 1.64 (1919); Bews Fl. Natal and Zululand 110 (1921).

Syn. *Apodynomene aemula* E. Mey. Comm. Pl. Afr. Austr. 113 (1836). *Cracca aemula* (E. Mey.) O. Ktze. Rev. Gen. Pl. 3.2.57 (1893).

Type specimen, *Drège* s.n. in Botanisches Museum, Berlin-Dahlem.

Subherbaceous. *Stems* very slender, procumbent, glabrous or thinly pubescent. *Leaves* 1–2 jugate, 3–11 cm. long, long petioled; leaflets elliptic- or cuneate-oblong, subobtuse, mucronulate, glabrous above, thinly appressedly pubescent below, 1–2·5 cm. long, 0·5–0·8 cm. broad. *Stipules* ovate, acuminate, 4–6 mm. long. *Peduncles* terminal and leaf-opposed, 10–25 cm. long, laxly few-flowered at apex; bracts ovate, bi-lobed at apex, 4–6 mm. long, caducous. *Flowers* 0·8–1·3 cm. long. *Calyx* teeth subulate, acuminate, sub-equal to or slightly longer than tube. *Style* bearded. *Legumes* linear, flat, 2·7–3·5 cm. long, 0·5–0·7 cm. broad, glabrous or very shortly appressedly pubescent along margins, about 10-seeded.

Cape.—Komgha district: between Zandplaat and Komgha, *Drège* (B.); Cape, Belfort, *Jacottet* 124 (Z.).

Natal.—Alexandra district: Dumisa, *Rudatis* 885 (B.M., V., G., P.); Durban district: pr. Durban, *Wood* (N.); *Wood* 6356 (K., N.); Clairmont, *Wood* 8027 (N.); Merebank, *Wood* 234 (B.M.); Pinetown district: Trappisten Kolonie, Mariannhill, *Landauer* (B.).

This species is frequently confused with the narrow-leaved form of *T. macropoda*. It may be distinguished, however, by its 1–2-jugate leaves, more slender stems, etc., and its more glabrescent habit.

67. **T. diffusa** Harv. in Harv. and Sond. Fl. Cap. 2.210 (1861–62); O. Kuntze Rev. Gen. Pl. 1.175 (1891); Wood Fl. of Natal 41 (1907); Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908); Burtt Davy and Potts in Ann. Tvl. Mus. 3.3.146 (1912); Bews Fl. Natal and Zululand 110 (1921); Watt and Breyer-Brandwyk Med. and Pois. Pl. of S.A. 74 (1932).

Syn. *Apodynomene diffusa* E. Mey. Comm. Pl. Afr. Aust. 113 (1836). *Cracca diffusa* (E. Mey) O. Kuntze Rev. Gen. Pl. 1.175 (1891).

Type specimen, *Drège* (Herb. Meyer 5478), in Botanisches Museum, Berlin-Dahlem.

Suffruticose, procumbent. *Stems* and branches subfiliform. *Leaves* 2–4-jugate, 2–4 cm. long, long petioled; leaflets subcuneate-oblong, appressedly puberulous, 0·8–2·5 cm. long, 3–7 mm. broad. *Stipules* ovate, striate, 5–7 mm. long, 2–3 mm. broad near the base. *Peduncles* leaf-opposed, few flowered, 1·5–6 cm. long. *Flowers* subtended by ovate, deciduous bracts, 5–6 mm. long and deeply bi-lobed at apex. *Calyx* tube 2 mm. long, 6 mm. in diam., lobes unequal, subulate, acuminate, very shortly ciliate, four lobes equalling tube, lowest longer. *Vexillum* 1·3 cm. long, 0·9 cm. broad. *Stamens* diadelphous. *Style* about 5 mm. long, thinly bearded. *Legumes* subglabrous, 2–2·5 cm. long, 4 mm. broad.

Cape. East Griqualand: Kokstad, *Thode* (B.); New Amalfi, *Forbes* 1123 (N.); hillside above Matatiele, *Galpin* 14077 (N., P.); Pondoland: inter Omsamouba and Omsamcaba, *Drège* [Herb. Meyer 5478] (K., B.); Pondoland, *Beyrich* 256 (B.).

Natal.—Inanda district: Inanda, *Wood* 886 (K., N.); Umhloti, *Wood* 713 (K., N.) Harding district: Murchison Flats near Oribi Flats, *McClean* 305 (N., P.); Bulwer district, top of the Peak, Byrne, *Galpin* 11974 (K., V., Pa., P., B.H.); New Hanover district; Noodsberg, *Wood* 886 (N.); Drakensberg district: Dooley Slopes, Mont-Aux-Sources: *Bayer* and *McClean* 206 (P.); Umlambonya Valley, Cathedral Peak Area, *Schelpe* 977 (N.).

This plant is called "iHlozane" by the Zulus, who use it as a parasiticide. It is said to be very poisonous.

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EXCLUDED SPECIES.

T. avasmontana Dtr.—Dolichos linearis E. Mey.
T. oblongifolia E. Mey—Ophrestia oblongifolia (E.M.) H.M. Forbes.

11. THE GENUS OPHRESTIA Forbes Gen. Nov.

In the course of an examination of the South African material of the genus *Tephrosia*, the marked difference of the venation of the leaflets of *T. oblongifolia* E. Mey. to those of any other species of this genus was noticed. One of the most conspicuous characteristics of *Tephrosia* is the close parallel veining of the leaflets, and this feature is not present in *T. oblongifolia*, whose leaflets show 5–7 prominent veins.

Burtt Davy also appears to have been puzzled by this plant, for, according to a note attached to a sheet in the National Herbarium, Pretoria, he made a new combination, *Glycine oblongifolia* (E. Mey.) B. Davy, which, however, he did not publish. In "The Flora of Transvaal and Swaziland" 1, 2 (1932) he adheres to the old name, although he used the distinctive character of "4–5 veins" to key out the species.

In Engler's Jahrb. 26, 302 (1899) Harms described a Transvaal plant as *Glycine*? *Wilmsii*, but material so named was all incorporated under *T. oblongifolia*, and the name *G.*? *Wilmsii* became a synonym. Although Harms described this plant tentatively as a *Glycine*, he does not seem to have been quite satisfied that the genus was correct. The number of leaflets probably accounted for this doubt, although he cites examples of two species having more than three leaflets.

An examination of all the material placed under *T. oblongifolia* indicates that there are four distinct species.

The plant first described as *T. oblongifolia* occurs in Natal and extends to the Eastern Cape Province as far south as East London. It is readily recognised by its oblong leaves.

Two species occur in the Transvaal, one a robust trailing plant, more or less densely hairy in all parts, and with leaflets having a retuse apex with a recurved mucro: the other with shorter stems, and leaflets with a straight acute apex.

The fourth species occurs in Swaziland.

The differences in the leaves and other characters are, in the writer's opinion, sufficient reasons to remove this group of plants from both the genera *Tephrosia* and *Glycine*. With two or three exceptions, *Glycine* has 3-foliolate leaves and, according to the material seen and to the descriptions of the various species, the leaves are distinctly long-petioled: the leaflets are generally of a membranous texture and stipellate. The group of plants under discussion all have subsessile leaves with leaflets almost coriaceous in texture and no stipellae.

There are also floral characters which differentiate this group from the two other genera. In *Tephrosia* and *Glycine* the vexillum is orbicular or suborbicular and may or may not be slightly auriculate. In these other plants the vexillum is "almost lyriform," as Harms aptly describes it, and distinctly tailed. The carina and alae are narrow and oblong, and are also distinctly tailed.

The epithet *Ophrestia*, an anagram of *Tephrosia*, is chosen for the new genus.

Ophrestia H. M. Forbes gen. nov., herba, e basi ramosa; caules procumbentes vel adscendentes, leviter flexuosi, pubescentes: folia brevissime petiolata, 1–5 foliolata; stipulae lineares vel lineari-subulatae: foliola elliptico-oblonga vel ovato-oblonga vel oblongo-lanceolata, 5–7-nervata, nerviis subtus prominentibus. *Pedunculi* axillares, graciles vel robusti, pauci vel multi florae; flores purpurei; pedicelli breves; lobi calycis

tubo subaequilongi vel longiores, ovato-acuti vel lanceolato-acuminati ; vexillum oblongum, superne dilatatum, fere orbiculatum, medio paullo constrictum, apice rotundatum vel emarginatum, basi auriculatum, extra pilosum ; alae sub-oblanceolatae, auriculatae, extra pilosae ; carina oblonga, auriculata, extra pilosa ; stamina monadelpha, stamine vexillare ad medium liberum ; ovarium pilosum, 2 4 ovulatum ; stylus brevis, glaber vel breviter barbatus ; stigma capitata. *Legumen* linearis, compressum, glabrescens.

Herb, branching from the base, stems ascending or procumbent, slightly flexuous, pubescent. *Leaves* subsessile, 1 5- jugate ; stipules linear to linear-subulate ; leaflets elliptic-oblong, ovate-oblong or lanceolate-oblong, apex obtuse, acute or retuse, mucronate, mucro sometimes recurved, nerves 5–7, prominent below, impressed above. *Peduncles* axillary, slender or robust, sometimes much exceeding the leaves, few to many-flowered. *Flowers* shortly pedicelled, petals mauve ; calyx usually densely hirsute, lobes ovate to lanceolate-acuminate, equaling or longer than the tube ; *vexillum* oblong, upper part dilated, almost orbicular, rotund or emarginate, slightly constricted in the middle, auriculate at base, pilose without ; *alae* almost oblanceolate, base auriculate, pilose without ; *carina* oblong, base auriculate, pilose without ; *stamens* monadelphous, vexillary stamen free from the middle ; *ovary* 2–4 ovulate, pilose ; *style* short, glabrous or slightly hairy ; *stigma* capitate ; *legume* linear, compressed, becoming glabrous.

KEY TO SPECIES.

Leaves obovate to cuneate-oblong, apex obtuse or retuse ..... A.	
Leaves oblanceolate to lanceolate, apex acute ..... B.	
A. Mucro not recurved, apex obtuse	1. *oblongifolia.*
Mucro recurved, apex retuse	2. *retusa.*
B. Leaves lanceolate, up to 1·5 cm. broad, stipules linear-lanceolate	3. *swazica.*
Leaves oblanceolate, up to 2 cm. broad, stipules narrow subulate-acuminate	4. *nervosa.*

1. **O. oblongifolia** (E. Mey.) H. M. Forbes, comb. nov.; *Tephrosia oblongifolia* E. Mey. Comm. Pl. Afr. Austr. 108 (1836) ; Hook. Sond. Journ. Bot. 2.86 (1843) ; Krauss in Fl. des Cap und Natallands 54 (1846) ; Harvey in Fl. Cap. 2.209 (1861–62) ; O. Kuntze Rev. Gen. Pl. 1.175 (1891) ; Wood Fl. Natal 42 (1907) ; Wood in Trans. S.A. Phil. Soc. 18.2.147 (1908) ; Burtt Davy and Pott in Ann. Tvl. Mus. 3. 3.146 (1912) ; Bews Fl. Natal and Zululand 111 (1921) ; Burtt Davy Fl. Tvaal. 1.2.377 (1932).

Glycine ? *Wilmsii* Harms in Engl. Jahrb. 26.302 (1899) in part.

Stems long and trailing, thinly pubescent. *Leaves* 1–5- jugate, subsessile, common petiole 2–7·5 cm. long ; stipules linear, 3–6 mm. long ; leaflets elliptic-oblong, entire, mucronate, glabrous above, pilose on the veins below, 2·5–7 cm. long, 0·9–2·5 cm. broad ; petiolules short, densely pilose. *Peduncles* axillary, 6–32 cm. long. *Flowers* up to 1·2 cm. long, 2–4 together ; pedicels about 1–2 mm. long. *Calyx* densely hairy ; petals hairy without. *Style* glabrous or with a few hairs along one side. *Legume* 3·5–4 cm. long, 7–5 mm. broad. Seeds small, blackish.

Type specimen, *Drège* in Botanisches Museum, Berlin-Dahlem.

Natal. Inanda district : Inanda, *Wood* 402 (K., N., P., Z., B. H.) ; Pinetown district : Fields Hill, *Wood* 11072 (Z., P.) ; Ixopo district : Dumisa, *Rudatis* 1530 (K.) ; *Rudatis* 1792 (P.) ; Port Natal, *Krauss* 174 (K.) ; no definite locality, *Drège* (K., B., O., Pa., V., G.).

Var. **velutinosa** H. M. Forbes var. nov., a typo foliola utrinque velutinosa, pedunculis et calycibus velutinosis differt.

Type of the variety, *Gerrard* 1082, in Natal Herbarium.

Natal.—Ixopo district: Dumisa, *Rudatis* 520 (P.); Izotsha, *Thode* (N.); no definite locality, *Gerrard* 1082 (K., N., V., Pa.).

The variety appears to be a slightly more robust plant and is much more pubescent in all parts than typical *O. oblongifolia*.

2. **O. retusa** H. M. Forbes, sp. nov., affinis *O. oblongifoliae* (E. Mey.), H. M. Forbes, sed foliolis apicibus retusis, mucrone reflexo differt.

Caules procumbentes, leviter flexuosi, pubescentes, usque ad 90 cm. longi. *Folia* breviter petiolata, 2–4-foliolata, 2–8 cm. longa; stipulae subulato-lanceolatae, 3–6 mm. longae; foliola cuneato-oblonga 2–4·5 cm. longa, 1–2 cm. lata, utrinque leviter pubescentia, apice mucronata, retusa, nerviis subtus prominentibus dense pubescentibus. *Pedunculi* usque ad 25 cm. longi, axillares, pubescentes. *Flores* 1·3 cm. longi; bracteae setaceae, circiter 4 mm. longae; pedicelli circiter 1·5 mm. longi; bracteolae 3 mm. longae, setaceae. *Calycis* dentes tubo excedentes, dense pubescentes; vexillum 1·3 cm. longum, apice emarginatum; stylus 1·5 mm. longus, glaber.

Stems procumbent, up to 90 cm. long, slightly flexuous, pubescent. *Leaves* subsessile, 2–4-jugate, 2–8 cm. long; stipules subulate lanceolate, 3–6 mm. long; leaflets cuneate-oblong, 2–4·5 cm. long, 1–2 cm. broad, thinly pilose on both sides, apices retuse, mucronate, mucro recurved, nerves very prominent on the lower surface, veining reticulate, midrib and veins below more densely pilose. *Peduncles* up to 25 cm. long, axillary, pubescent. *Flowers* 1·3 cm. long, 2–4 together; bracts setaceous, about 4 mm. long; pedicels about 1·5 mm. long; bracteoles 3 mm. long, setaceous. *Calyx*-teeth longer than tube, densely pubescent; *vexillum* 1·3 cm. long, about 5 mm. broad at upper and widest part, emarginate, auriculate, pilose on outer surface; carina and alae slightly shorter than vexillum, about 2 mm. broad, auriculate, pilose on outer surface. *Ovary* 4 mm. long, densely pilose; style 1·5 mm. long, glabrous.

Type specimen, *Dyer* and *Verdoorn* 3405, in National Herbarium, Pretoria.

Transvaal.—Lichtenburg district: Klipveld, *Liebenberg* 87 (P.); Grasfontein, *Sutton* 302 (P.); Pretoria district: Bryntirion, *Smith* 3353 (P.); Rietondale Pasture Research Stn., *Trapnell* 635 (K.); "The Willows," Pretoria, *Burtt Davy* 2526 (B.H., P.); Koedoespoort, *Mogg* (P.); Daspoort, *Leendertz* 580 (Z., B.H.); Magaliesberg, *Dyer* and *Verdoorn* 3405 (P.); *Burke* 358 (K., Z.); Rustenburg district: Matlapansberge, *Rehmann* 5551 (K., Z.); Rustenburg, *Nation* 85 (K., B.H.); Vlakfontein, *Liebenberg* 138 (P., G.).

3. **O. swazica** H. M. Forbes sp. nov., affinis *O. retusae* H. M. Forbes, sed foliolis lanceolatis apicibus acutis differt.

Caules graciles, leviter pilosi, ascendentes vel procumbentes, usque ad 48 cm. longi. *Folia* breviter petiolata, 1–3-jugata; petioli 0·5–2·7 cm. longi; stipulae lineares, 2–6 mm. longae; foliola lanceolata, mucronulata, 2–5·8 cm. longa, 0·6–1·5 cm. lata, mucrone circiter 1 mm. longa, supra glabra, subtus nerviis parce pilosis. *Pedunculi* axillares, usque ad 9 cm. longi; bracteae setaceae, 3 mm. longae; pedicelli circiter 3 mm. longi; bracteolae setaceae, circiter 1·5 mm. longae. *Flores* 1·5 cm. longae; dentes calycis tubo excedentes; stylus 1·5 mm. ongus, glaber vel parce pilosus.

Stems slender, thinly pilose, ascending or procumbent, up to 48 cm. long. *Leaves*; shortly petiolate, 1–3-jugate, petiole 0·5–2·7 cm. long; stipules linear, 2–6 mm. long; leaflets lanceolate, 2–5·8 cm. long, 0·6–1·5 cm. broad, mucronate, glabrous above, thinly pilose on the veins below. *Peduncles* axillary, up to 9 cm. long, few flowered near the apex; bracts setaceous, 3 mm. long; pedicel about 3 mm. long. *Calyx*-lobes lanceolate, longer than the tube, tube 3 mm. long, lobes 6 mm. long; *vexillum* 1·5 mm. long, glabrous or with a few hairs along one side. *Mature legumes* not seen.

Type specimen, *Bolus* 11845, in National Herbarium, Pretoria.

Swaziland.—In collibus, in terra " High Veld " dicta inter Dalriach et Forbes' Reef *Bolus* 11845 (P., K., A.M., B.H.).

4. **O. nervosa** H. M. Forbes sp. nov., affinis *O. swazicae* H. M. Forbes, sed foliolis oblanceolatis subtus nervis valde prominentibus differt.

Caules procumbentes, leviter flexuosi, pubescentes. *Folia* 1–3-jugata, 1–4 cm. longa ; stipulae angusto-subulatae vel lineares, 4–7 mm. longae ; foliola oblanceolata, apice acuta, mucronata, nervis subtus valde prominentibus, utrinque parce pilosa, 2·8–5·5 cm. longa, 1·7–2 cm. lata. *Pedunculi* axillares, 5–13 cm. longi ; bracteae setaceae, 2 mm. longae ; pedicelli 1·5 mm. longi ; bracteolae setaceae, 3 mm. longae. *Flores* 1·1 cm. longi ; vexillum 1·1 cm. longum, apicem versus 4 mm. latum. *Ovarium* pilosum ; stylus 1·5 mm. longus, glaber.

Stems procumbent, slightly flexuous, pubescent. *Leaves* 1–3 jugate, common petiole 1–4 cm. long ; stipules narrow-subulate to linear, 4–7 mm. long ; leaflets oblanceolate, apex acute, mucronate, nerves very prominent on lower surface, thinly pilose on both sides, 2·8–5·5 cm. long, 1·7–2 cm. broad. *Peduncles* axillary, 5–13 cm. long ; bracts setaceous, 2 mm. long ; pedicels 1·5 mm. long ; bracteoles setaceous, 3 mm. long. *Flowers* 1·1 cm. long. *Vexillum* 1·1 cm. long, 4 mm. broad towards the apex ; alae and carina 2 mm. broad, alae slightly shorter than carina. *Ovary* pilose, 4 mm. long ; style 1·5 mm. long, glabrous. *Legume* up to 3·5 cm. long and 0·8 cm. broad, shortly pubescent.

Type specimen, *Thode* A 1394 in Natal Herbarium, Durban.

Transvaal.—Marico district : Zeerust, *Thode* A 1394 (N., P.) ; Lydenburg district : Lydenburg, *Wilms* 383 (K., B.) ; Lydenburg, *Schlechter* 3962 (Z., B.H.) ; no definite locality " Bushveld," *Rehmann* 5186 (Z.) ; *Zeyher* 520 (K.).

A NEW SPECIES OF FICUS FROM THE BORDERS OF MOCAMBIQUE AND NYASALAND.

By A. J. W. Hornby.

Ficus kiloneura A. J. W. Hornby sp. nov., affinis *F. populifoliae* Vahl, sed receptaculis majoribus non reticulatis cortice cinereo (non luteo) differt.

Arbor magna circa 15m. alta, multo ramosa; ramuli cortice cinereo glabro obtecti. *Stipulae* glabrae, lanceolatae, 1 cm. longae, caducae. *Folia* late ovata, breviter acuminata, basi late cordata vel rotundata, 9–18 cm. longa, 7–11 cm. lata, chartacea, glabra; costa media supra impressa vel proparte prominens, subtus prominens apice extenuata; nervi laterales utrinsecus circa 15, utrinque prominentes, angulo 70° abeuntes, pellucidi, paralleli, marginem versus conjuncti; veni numerosi utrinque prominentes, reticulati; margines integri, incrassati; petioli 4·5–10 cm. longi, glabri, sulcati. *Receptacula* axillaria, pedunculata, oblongo-globosa, 1·5–2 cm. diametro, glabra, aureo-lepidota, umbonata; ostiolum bilabiatum bracteis omnibus in receptacula descendentibus; pedunculi 1·8 cm. longi. *Bracteae* basales rudimentalae.

N. Mocambique.—Province do Niassa, *Hornby* 2471 in National Herbarium, Pretoria (type); 2581; 2571.

Large trees up to 15 metres, much branched, flat crowned. Trunk buttressed by anastomosing growths, aerial roots present. Profuse exudation of milky juice on wounding, which is used as bird lime. Branches numerous, grey, irregularly ribbed and cracked. Bark on trunk irregularly cracking, or widely reticulate; on branches smooth and grey with vertical and horizontal cracks. Assimilating green tissue lightly covered with thin bark on younger trees. *Stipules* about 1 cm. long, lanceolate, glabrous, caducous; petiole 4·5–10 cm. long, slender, glabrous, channelled; leaf margin decurrent on upper side of petiole. *Leaf-blade* broadly ovate, 9–18 cm. long, 7–11 cm. broad, chartaceous, glabrous and dull on both sides; midrib depressed or partly prominent above, prominent below, continued to apex; lateral veins about 15 pairs, spreading from the main vein at about 70°, prominent above and below, looping prominently near the margin, pellucid, lowest three main lateral veins arising from cordate base and curving upwards, the rest straight, parallel, net veins very numerous, close and slender, forming prominent reticulation above and below; margin entire, thickened; apex acute to shortly acuminate, acumen about 8 mm. long; base widely cordate or rounded. *Receptacles*, axillary in pairs, pedunculate, oblong-globose, not over 2·0 cm., usually 1·5 cm. diameter, glabrous, golden-lepidote, umbonate, osteole pore-like, bracteoles descending into fig; basal bracts, rudimentary at apex of peduncle; peduncle up to 1·8 cm. long.

Occurrence.—Type specimens found 100 yards south of Nyasaland Police and Customs Post at Chiponde fork roads west of frontier between Provincia do Niassa, Mocambique and Nyasaland.

This species of *Ficus* also occurs as single large trees in the south-western zone of the Province of Niassa near the frontier of Nyasaland at an altitude of about 750 metres and where the average annual rainfall is about 900 mm. They are found both in *Brachystegia* associations on fertile sandy loams under dominant *B. spicaeformis*, and in open woodland on deep brown loams associated with large *Ostryoderris stuhlmannii*, *Pseudolachnostylis maprouneifolia*, and smaller trees of *Voacanga lutescens*, *Vitex buchananii*, *Schrebera* sp., *Strychnos spinosa*, *Bauhinia petersiana*, *Ficus stuhlmannii*.

There is extensive shrub growth in these open woodlands consisting of *Cassia petersiana, Cassia absus, Crotalaria intermedia, C. comosa, C. natalitia, Byrsocarpus tomentosus, Temnocalyx obovatus, Clerodendrum triplinerve* with medium high species of *Hyparrhenia Cymbopogon, Brachiaria*, etc.

The zone in which this species of *Ficus* occurs is regarded as one of the best for cultivation of flue-cured tobacco.

I should like here to add my acknowledgement and thanks to the Division of Botany and Plant Pathology, Pretoria, for assistance in determinations of specimens during my ecological work in the sub-tropical region of S.E. Africa.

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